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Constabel (F.). **Ernährungsphysiologische und manometrische Untersuchungen zur Gewebekultur der Gymnosporangium-gallen von Juniperus-Arten.** [Nutritional-physiological and manometric studies on the tissue culture of *Gymnosporangium* galls of *Juniperus* species.]—*Biol. Zbl.*, **76**, 4, pp. 385–413, 4 fig., 10 graphs, 1957. [51 refs.]

On none of the various media tested at the Pflanzenphysiologisches Institut, University of Göttingen, Germany, was it possible to secure potentially unlimited growth of the galls formed by *G. sabinae* on *J. sabina* and by *G. clavariiforme* on *J. hibernica* though considerable development occurred, e.g., on 10% coconut milk or yeast extract combined with 10^{-6} g./l. β-indole-acetic acid, 0·1 M glucose and saccharose, and a mineral solution in which the Ca : K ratio was 1 : 1 or 2 : 1. However, the max. longevity of any of the cultures was 16 weeks. The browning of the tissues, due to melanin, on the cessation of growth could be inhibited by adding reducing substances to the medium, but no improvement in cultivability was affected thereby.

The respiration of gall tissues was increased by 0·1 M glucose (in preference to saccharose), 10^{-7} M β-indole-acetic acid, or 10% coconut milk or yeast extract. The respiratory activity of the gall tissue on *J. hibernica* was more intense than that of the healthy.

In none of the several thousand cultures maintained under a variety of nutritional-physiological conditions and external surroundings did the mycelia of the above-mentioned *G.* spp. or of *G. juniperi-virginianae* [**33**, p. 248], used for comparison, proceed from the parasitic to the saprophytic state nor did they penetrate into the substratum of the tissue cultures. Teleutospores of *G. juniperi-virginianae*, disposed in a slightly abnormal manner, were produced in 3 of 33 galls on *J. virginiana* but none developed in the other 2 species.

Salisbury (P. J.). **Heavy damage to Chinese Junipers, Juniperus chinensis L., associated with Pestalotia funerea Desm.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **13**, 6, p. 4, 1957.

In the summer of 1957 Chinese junipers in a Victoria nursery, British Columbia, both prostrate and erect forms, bore lesions on twigs, and on main stems at ground level, sometimes girdling. *P. funerea*, isolated from dead bark, was thought to be responsible, encouraged by environmental conditions that weakened the plants.

Regler (W.). **Der Kieferndrehrost (Melampsora pinitorqua), eine wirtschaftlich wichtige Infektionskrankheit der Gattung Pinus.** [The Pine twisting rust (*Melampsora pinitorqua*), an economically important infectious disease of the genus *Pinus*.]—*Wiss. Abh. dtsch. Akad. LandwWiss., Berlin*, 27 (*Beitr. Pappelforsch.* 2), pp. 205–234, 1957. [Abs. in *For. Abstr.*, **19**, 2, p. 240, 1958.]

A general description, based on the literature, is given of the life-history of *M. pinitorqua* [*M. tremulae*: cf. **37**, p. 190], the damage caused, and its control. Overwintering of the uredo stage was observed in buds of *Populus alba* and *P. canescens*, but not in those of *P. tremula*.

Hayes (G. L.) & Stein (W. I.). **Eliminating blister rust cankers from Sugar Pine by pruning.**—*Res. Note Pacif. Northw. For. Exp. Sta.* 151, 8 pp., 3 fig., 1957.

Infection by blister rust [*Cronartium ribicola*: **30**, p. 351; **36**, p. 148; **37**, p. 321] on sugar pine [*Pinus lambertiana*] in the South Umpqua Experimental (mixed conifer) Forest, S.W. Oregon [cf. **28**, p. 258; **34**, p. 826], has become widespread

since the disease was first reported in this area almost 20 years ago [**18**, p. 3]. Of 687 living pines examined in 1952, 10·6% had cankers in the trunk and were regarded as past saving, and a further 18·5% bore branch cankers which it was possible to eliminate by pruning; 70·9% were unaffected.

The survey indicated that the number of sugar-pine crop trees present could be substantially increased by removing a moderate number of cankers from vigorous trees. Cankers were, accordingly, pruned from selected trees in 13 patches of reproduction. The objective was achieved at a reasonable cost. After they had acquired the necessary experience the contractors consistently succeeded in cleaning away all visible infection from 95% or more of the trees.

KLAWITTER (R. A.). **Most cankered trees are good risks in Loblolly Pine sawtimber stands.**—*Res. Note Stheast For. Exp. Sta.* 107, 2 pp., 1957. [Abs. in *For. Abstr.*, **19**, 2, p. 239, 1958.]

Twenty-one dominant and co-dominant loblolly pines [*Pinus taeda*] in the Santec Experimental Forest, U.S.A., with 10–50% of the circumference cankered by fusiform rust [*Cronartium fusiforme*], made equal growth to sound trees in an adjoining plot over a period of 10 yr. They also withstood gales up to 60 m.p.h.

LEROY (M.). **Enseignements à tirer d'une attaque de rouge cryptogamique dans les régénérations de Pin sylvestre de la Forêt de Haguenau.** [Lessons to be learned from an outbreak of fungus reddening in *Pinus sylvestris* regeneration in the Forest of Haguenau.]—*Rev. for. franc.*, **9**, 10, pp. 745–749, 1957. [Abs. in *For. Abstr.*, **19**, 2, p. 235, 1958.]

Lophodermium pinastri was more severe in dense groups of natural regeneration of *P. sylvestris* than in plantations, and in broadcast than in strip sowings. Where sowing had been carried out in strips with the material removed piled along the sides, seedlings that overtopped this pile remained unaffected, whereas all those below this level were severely attacked. Where weeds and grass were allowed to grow between sown strips the same difference was apparent between seedlings above and below the level of the weeds. Plantations on clean, cultivated, regularly weeded ground were healthy.

ETHERIDGE (D. E.) & CARMICHAEL (ELIZABETH). **Antagonism by Coryne sarcoides (Jacq.) Tul.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **13**, 6, pp. 2–3, 1957.

Further studies [**37**, p. 120], using a larger sample (79 isolates from various hosts, 8 from Britain), disclosed considerable variability between the antagonism of *C. sarcoides* isolates to *Coniophora puteana* and *Peniophora septentrionalis* on agar. All Canadian isolates from lodgepole pine [*Pinus contorta* var. *latifolia*] were effective against *P. septentrionalis*, a fungus unknown on living trees of this species, though common on white spruce [*Picea glauca*].

OKANOUE (M.). **On an injury to Akamatsu (Pinus densiflora Sieb. et Zucc.) Forest in the vicinity of the smelting works at Hitachi.**—*Bull. For. Exp. Sta., Meguro* 105, pp. 141–147, 1 fig., 3 graphs, 1 map, 1958. [Japanese. Abs. from English summary.]

The injury, which occurred in the summer of 1955, was caused by smoke. The damaged trees were 1–3 km. away from the chimney (which had good prevention equipment), had been planted 1–5 years before, and no injury had resulted. On 2nd July temperature inversion occurred and this is believed to be responsible; there was an emission of poisonous gas from the smelting works (in spite of the preventive equipment) during a period of unfavourable meteorological conditions.

Bavendamm (W.). **Querschnitt durch die Holzschutzprobleme der Gegenwart.** [Cross section of contemporary wood preservation problems.]—*Holzzentralbl.*, **83**, 136, pp. 1655–1656, 1957. [Received 1958.]

This report of the 5th Wood Preservation Conference at Munich, Oct. 1957, includes a paper by Dr. G. Becker (Bundesanstalt für Materialprüfung, Berlin-Dahlem) on 'Wood-destroying animals and wood preservation in sea water', in which recent research into the symbiosis of *Limnoria* and Teredinidae with marine fungi [unspecified] is reported. It was found that *Limnoria* are unable to digest native, long-chain cellulose, but depend on ascomycetes and fungi imperfecti that break down the cellulose. Where these were not present *Limnoria* could neither attack wood nor live on it [cf. **37**, p. 322]. Both the capacity of teredinid larvae to attach themselves and the development of young adults appear to depend largely on marine fungi and other micro-organisms. Heavy coal tar oil proved the most effective preservative material, requiring a min. absorption of 200 kg./cu.m. Copper compounds have given promising results too.

In a paper on 'Wood destroying fungi in sea water' J. Kohlmeyer reported that by destroying or roughening the surface the *Limnoria* facilitate the entry of fungi into the wood and help to spread them by endozoic spore dispersal. The fungi attack the wood in a manner resembling that of the soft-rot fungi, breaking down, in the first place, the unlignified layers of the cell wall, the hyphae growing inside them in the direction of the cellulose fibrils.

M. Gersonde reported on his research into the susceptibility to poison of strains of wood-destroying fungi. Comparative tests with different strains of *Coniophora cerebella* [*C. puteana*], *Poria vaporaria*, *P. vaillantii*, *Merulius lacrymans*, *M. silvester*, and *Lentinus lepideus* were made with a view to obtaining a better assessment of the preservative tests and the choice of suitable test strains, as well as a clarification of their physiological behaviour and taxonomic position.

Similar ground was covered by G. Schulz in a paper 'Comparison of strains of *Lentinus lepideus*'. Both these papers stressed the existence of strains exceeding in tolerance those commonly used in testing.

Demidova (Mme Z. A.). О влиянии сезона заготовки древесины на поражаемость грибами. [Concerning the influence of seasonal treatment of timber and infection by fungi.]—*Trud. Inst. Biol. Acad. Sci. U.S.S.R.*, fil. Ural, Ser. 5, 2, pp. 100–110, 1954. [Received May 1958.]

In tests on pine blocks from the heartwood, those containing cambium, and those cut tangentially, infected artificially with *Corticium laeve*, *Coriolellus* [*Trametes*] *serialis*, *Coniophora cerebella* [*C. puteana*: **37**, p. 323], *Coriolus vaporarius* [*Poria vaporaria*], *Serpula* [*Merulius*] *lacrymans* [see below], *Gleophyllum sepiarium* [*Lenzites saepiaria*], and *Ceratostomella* [*Ceratocystis*] *piceae*, the most resistant timber was the heartwood of trees felled in summer, compared with those felled in autumn and winter. Residues of cambium and tangential wood increase risk of attack by fungi. Drying of timber before use is necessary.

Demidova (Mme Z. A.). Обработка кремнефтористым аммонием, как средство повышения стойкости деревесины против поражения домовым грибами. [Treatment with ammonium fluosilicate as a control of destruction by house fungi.]—*Trud. Inst. Biol. Acad. Sci. U.S.S.R.*, fil. Ural, Ser. 5, 2, pp. 87–99, 4 fig., 1954. [Received May 1958.]

Experiments in the laboratory, at timber stations, in hothouses, and in dwellings in U.S.S.R., with *Serpula* [*Merulius*] *lacrymans*, *Coniophora cerebella* [*C. puteana*], and *Coriolus vaporarius* [*Poria vaporaria*: **37**, p. 323 and above and below], showed that 2 surface applications to timber with a 3% aqueous solution of ammonium

fluosilicate protected new timber for 6–12 months and a 5–10% solution checked spread on infected timber.

FELKLOVA (MELANIE). **Příprava očkovacích koncentrátů drevokazných húb.** [Preparation of inoculation concentrate from wood fungi.]—*Čes. Mykol.*, **11**, 4, pp. 241–246, 1 diag., 1957. [Russian and German summaries.]

A convenient form of inoculum was prepared at the Natural History University of Brno, Czechoslovakia, for *Coniophora cerebella* [*C. puteana*], *Merulius lacrymans*, *Trametes* [*Polystictus*] *versicolor*, *Fomes fomentarius*, *Polyporellus* [*Polyporus*] *squamosus*, *Pleurotus mutilus*, *Schizophyllum commune*, *Phellinus* [*Fomes*] *igniarius*, and *Gloeophyllum saepiarium* [*Lenzites saepiaria*] on sorghum straw and humus substrate with sawdust. Inoculum so prepared should be introduced during spring or the autumn into compost placed round the tree.

PRICE (E. A. S.). **Correlating laboratory and field tests on the behaviour of a wood preservative towards soft rot.**—*Wood*, **22**, 5, pp. 193–196, 2 fig., 1957.

In laboratory tests at Hickson's Timber Impregnation Co. (G.B.) Ltd beech blocks treated with a mixture of 45% potassium dichromate, 35% copper sulphate, and 20% arsenic pentoxide according to British Standards Procedure 838 were subjected to leaching for 28 days in a washing apparatus and then tested on mats of *Chaetomium globosum* F.P.R.L. S70B [**34**, p. 414]. A 3% solution of the preservative was sufficient to prevent loss in weight during a 6-week incubation period.

Scots pine blocks 2 ft. $\times 1 \times \frac{1}{2}$ in. treated with the preservative by vacuum pressure in a pilot plant were tested in a cooling tower [cf. **37**, pp. 383, 426]. Both heartwood and sapwood were equally susceptible to soft rot; a 4% solution of preservative inhibited rotting but a 2% did not; and the solution conferred protection for at least 23 months. The absorption rate for pine was 4·3 gal./cu. ft. for sapwood and 3·3 for heartwood.

There was a marked conformity in the response of 6 soft-rot fungi (*C. globosum*, *C. elatum*, *C. cochlioides*, *Stysanus* sp., *Coniothyrium* sp., and *Trichurus terrophilus*) to a range of fungicides in agar plate tests. The author concludes that if soft rot fungi be assumed to show a like conformity in their response to preservatives in the field then the results of laboratory tests with a standard fungus might be taken as being widely applicable.

On the evidence available it was not clear whether the working correlation secured between laboratory and 'field' results was coincidental.

JACQUIOT (C.). **Sur la résistance aux délavages du sulfate de cuivre fixé dans le bois par le procédé Boucherie.** [On the resistance to leaching of copper sulphate fixed in wood by the Boucherie process.]—*Chim. & Industr.*, **78**, 6, pp. 629–631, 1 diag., 1957. [English & Spanish summaries.]

In poles treated by the Boucherie process [cf. **26**, p. 368; **27**, p. 303, *et passim*] in France the copper sulphate (5–10 kg./cu. m.) united with the cell proteins to form a complex which fixed it so strongly in the wood that the measure of protection against *Poria vaporaria* and *Trametes* [*Lenzites*] *trabea* remained essentially unchanged after up to 250 Soxhlet leachings by the standard N.F. X–41–502 method.

MATUO (T.) & SAKURAI (Y.). **Pathological studies of the 'bud blight' of Mulberry trees. III. On the relation between this disease and the varieties of the Mulberry tree.**—*J. seric. Sci., Tokyo*, **26**, 6, pp. 399–405, 1 fig., 1957. [Japanese. Abs. from English summary.]

In this further contribution from the Faculty of Textile and Sericulture, Shinshu University, inoculation studies with 16 mulberry varieties infected by bud blight [*Gibberella lateritia*: **34**, p. 233] showed that the resistance of vars. like Kenmochi was due in part to the formation of a wound cork layer. Wound gum is more

abundant in resistant than in susceptible vars., but is insufficient to check the spread of the pathogen entirely.

Sakurai (Y.) & Matuo (T.). **On a Fusarium disease of Mulberry twigs caused by Hypomyces solani (Rke. et Berth.) Snyd. et Hans.**—*Res. Rep. Fac. Text. Seric. Shinshu Univ.* 7, pp. 18–24, 2 fig., 1957. [Japanese. Abs. from English summary.]

H. solani was found to cause a mulberry disease less common than the bud blight due to *F. lateritium* [*Gibberella lateritia*: see above], which it resembles, but widespread and causing considerable damage in the spring. The *Hypomyces* state occurred naturally and was also obtained by crossing the two groups into which all the strains found could be placed; these differed in their cultural characters, morphology, and pathogenicity.

Zabel (R. A.) & O'Neil (F.). **The toxicity of arsenical compounds to micro-organisms.**—*Tappi*, **40**, 11, pp. 911–914, 1957.

Of 44 arsenical compounds evaluated at the State University College of Forestry, Syracuse University, New York, for their toxicity to 4 micro-organisms forming slime in paper mills, methyl arsenate and arsanilate of 8-hydroxyquinoline were the most effective against *Aspergillus niger* and *Penicillium expansum* [cf. **33**, p. 370]. The growth of *A. niger* was inhibited at 60 p.p.m. of the former compound and 90 of the latter, the corresponding figures for *P. expansum* being 45 and 70.

Faan (H.-C.) & Ko (C.). **A preliminary study of the mosaic virus of Crucifers in the vicinity of Canton.**—*Acta phytopath. sinica*, **3**, 2, pp. 155–168, 1 pl., 1957. [Chinese. Abs. from English summary.]

Around Canton mosaic is a major disease of turnip, pak-tsai [Chinese cabbage], mustard, and Chinese radish, field infection during 1951–54 being 30–80% in turnip and 5–50% in the others. At the S. China College of Agriculture 77 virus isolates were differentiated into 4 groups each represented by a type isolate: group 1 (5 isolates) caused mosaic on Chinese cabbage and local lesions on tobacco and *Nicotiana glutinosa*; group 2 (64 isolates) caused mosaic on Chinese cabbage, but was non-pathogenic to the other hosts; groups 3 and 4 (8 isolates) induced mosaic on all 3 hosts, but were only slightly pathogenic to Chinese cabbage.

When *Chrysanthemum spatiosum* was used as a test plant, the physical properties of the four groups were found to be similar. Host range tests were made on 57 spp. belonging to 36 genera of 17 families. It was concluded that group 1 was closely related to turnip mosaic virus [**16**, p. 359; **37**, p. 255] and also to 'kwuting' of Chinese cabbage [**37**, p. 257], group 2 was identified as Ling and Yang's rape mosaic virus [**19**, p. 514], and groups 3 and 4 as strains of cucumber mosaic virus.

Rich (S.). **Griseofulvin, lithium salts and zinc glass frit for control of Cabbage club root.**—*Plant Dis. Reptr*, **41**, 12, pp. 1033–1035, 1957.

At Connecticut Agricultural Experiment Station, New Haven, griseofulvin proved effective against *Plasmodiophora brassicae* on Michihli Chinese cabbage when mixed with inoculated, dry soil at 20 or 40 mg./kg. before planting, only 2 of 10 plants developing clubs in each test. No downward translocation was detected when the antibiotic was applied to the leaves [**36**, p. 815]. Zinc glass frit [**37**, p. 1] at 1 g./kg. reduced infection (6 plants clubbed) but lithium salts were ineffective.

Sborník cukrovarnico-Řepařské konference v Praze 1955. I, II. [Records of the conference on sugar and Beet at Prague 1955. I, II.]—1121 pp., 49 pl., 3 diag. (1 col.), 91 graphs, Ministry of food production, Prague, 1957. [Papers in various languages with Czech, Russian, and German summaries.]

In the disease and pest section (pp. 467–580) of this report I. F. Buzanov (pp. 467–

482), gives the basic principles of the control of diseases and pests of sugar beet in U.S.S.R. A. Rakovita (pp. 483–501) deals with the protection of beet in Romania, where diseases include 'tail' rot or 'gummosis', which in dry years may reduce yields by 40–80%, *Cercospora beticola*, beet leaf curl and yellows viruses, and a physiological disorder causing rotting in storage. J. Chrzanowski (pp. 502–514), from Poland, reported on methods of estimating the effectiveness of materials for beet seed disinfection. A. Kovács (pp. 530–535), from Hungary, discussed the influence of beet yellows virus infection on resistance to *C. beticola* [cf. **35**, p. 805; **36**, p. 294]; Beta 243/53 possesses high resistance. Conidia of *C. beticola* germinated more rapidly in dew collected from the leaves of yellows-infected plants (both susceptible and resistant to leaf spot) than in that from healthy plants [cf. **35**, p. 258]. J. Trzebiński (pp. 536–550), from Poland, reported on the chemical diagnosis of sugar beet yellows virus based on the iodine test, the starch content being higher in infected leaves. M[iroslava] Drachovská & G. Vokác (pp. 551–559), from Czechoslovakia, submitted a contribution to the serological diagnosis of beet yellows virus [cf. **36**, p. 157; **37**, p. 385]. The strongest serological reaction was obtained with the outer leaves of plants showing typical 'golden' symptoms; those with net symptoms or veinclearing also reacted positively, and virus was sometimes detected in the stems and roots.

Van Steyvoort (L.). **La jaunisse de la Betterave.** [Beet yellows.]—*Publ. Vulg. Inst. belge Amélior. Better., 1957*, 1, pp. 5–6, 1957.

Essential information is presented in popular terms on the control of beet yellows virus, the most serious disease of the crop in Belgium [**36**, p. 628], by cultural and sanitary methods and spraying with one of the systemic aphicides, parathion, malathion, dieldrin, or aldrin; annual spraying is profitable, however, only in the regions of Tournai, S. of Furnes, N. of Hainault, and the sandy-clay tract of Flanders and Brabant. The necessary density of stand to impede aphid multiplication is assured by the retention of 33 plants/linear dm. in thinning and spacing operations.

Bennett (C. W.) & Duffus (J. E.). **Rosette disease of Sugar Beet.**—*Plant Dis. Reptr*, **41**, 12, pp. 1001–1004, 2 fig., 1957.

Dwarfing and rosetting of sugar beet tops in California is severely damaging to individual plants but incidence is low and scattered. At the Agricultural Research Station, Salinas, the causal virus, believed to be new to beet, is named sugar beet rosette virus. It was transmitted by grafting with diseased root tissue and by means of *Cuscuta campestris* to a low percentage of plants, but not by *C. californica* or *C. subinclusa* or by sap or insects. The disease has been recorded only on sugar beet.

Meier (W.). **Ergebnisse der Sortenprüfung bei Zuckerrüben 1954–1956.** [Results of Sugar Beet variety tests 1954–1956.]—*Mitt. schweiz. Landw.*, **5**, 5, pp. 92–94, 1957.

At trials at the Eidgenössischen Landwirtschaftlichen Versuchsanstalt at Lausanne, Liebefeld-Bern, and Zürich-Oerlikon the following sugar beets were rated fairly resistant to leaf spot (*Cercospora* [*beticola*: **34**, p. 504]): Kleinwanzleben Polybeta, Hilleshög K, Hilleshög Polyploid, and Beta K-91, in comparison with Kleinwanzleben N which was fairly highly susceptible.

McEwen (F. L.), Schroeder (W. T.), & Davis (A. C.). **Host range and transmission of the Pea enation mosaic virus.**—*J. econ. Ent.*, **50**, 6, pp. 770–775, 1957.

In greenhouse trials at New York Agricultural Experiment Station, Geneva, crimson clover, common vetch, and hairy vetch [*Vicia villosa*] were the most

susceptible of the common legumes to inoculation with pea enation mosaic virus by means of *Macrosiphum pisi* [*Acyrthosiphon pisum*: **35**, p. 806]. Less readily attacked were yellow and white sweet clovers [*Melilotus officinalis* and *M. alba*], while only a few lucerne and white, Ladino, and alsike clover plants contracted infection.

In pea to pea transmission tests with *A. pisum* the minimum acquisition feeding period was 2 hr.; 5 min. feeding sufficed to cause infection, and the minimum total transmission period was 24 hr. A parathion residue was of little value in the protection of pea plants from infection by immediate feeding of viruliferous aphids. Although a 7–9 day period was requisite for the development of visible symptoms in peas, the virus was fully available to the aphids 3–5 days after initial infection.

BURKHOLDER (W. H.). **Pea Bean rust in New York State.**—*Plant Dis. Reptr*, **41**, 12, p. 1036, 1957.

In W. and N. of New York State a race of *Uromyces phaseoli typica* [*U. appendiculatus*] on pea beans [*Phaseolus vulgaris*] (mostly var. Michelite) appears unable to attack the other dry beans commonly grown. Defoliation progresses rapidly after infection has become general but the fungus has not been observed on the pods. As the disease develops late in the season, it hastens pod maturity, and damage by early frosts is avoided, an advantage to the grower.

MCEWEN (F. L.), NATTI (J. J.), HERVEY (G. E. R.), & SCHROEDER (W. T.). **The relative effectiveness of various insecticide-fungicide seed treatments on Lima Beans after several months' storage.**—*J. econ. Ent.*, **50**, 6, pp. 775–777, 1957.

In tests in 1955–6 at New York Agricultural Experiment Station, Geneva, involving the treatment of Lima bean [*Phaseolus lunatus*] seed against [unspecified] decay fungi with arasan SF-X combined in various proportions with 25% diazinon and 75% dieldrin and lindane [cf. **35**, p. 911] followed by 8 months' storage, very few plants emerged from seed not treated with the fungicide, while failure to apply an insecticide resulted in damage to about 55%.

SHUMILENKO (E. P.). Белая гниль Моркови. [White rot of Carrots.]—*Trud. Inst. Biol. Acad. Sci. U.S.S.R.*, fil. Ural, Ser. 5, 2, pp. 21–33, 3 fig., 1954. [Received May 1958.]

Studies in the U.S.S.R. from 1948–50, on white rot (*Sclerotinia libertiana*) [*S. sclerotiorum*: **36**, p. 509] of carrots in the field and in storage showed that humidity plays the most important part in the spread of the disease. Dry sclerotia remain viable for 3–5 years in the laboratory. For the growth of the mycelium 19–26° C. is opt. and for the sclerotia 16°, 22–26° arresting development as also does $NaNO_3$ added to the culture. Fertilizers with K and P and schistose ash checked the disease and assured healthy seeds for the following year.

TETEREVNIKOVA-BABAYAN (Mme D. N.) & SIMONYAN (S. A.).—Мучнистая роса Тыквеных растений. [Powdery mildew on Cucurbits.]—*Nauch. Trud. erevansk. Univ., Ser. biol. Sci.* (6), **54**, 1, pp. 53–78, 1956. [Armenian summary. Received June 1958.]

This detailed study on powdery mildew (*Sphaerotheca fuliginea* and *Erysiphe cichoracearum* f. *cucurbitacearum*) on cucurbits [**37**, p. 256] in Armenia and Astrakhan showed that the latter fungus is very severe on cucumbers and melons and less so on water-melons, pumpkins, and marrows. *Lagenaria vulgaris* is also attacked. The disease becomes epyphytotic from late July to Sept. and cucurbit crops are best planted in Armenia before 10 May or after 25 June. *S. fuliginea* was isolated more often from melons, pumpkins, and marrows than from cucumbers.

Atanasov (S.). Нови ефикасни препарати против крастата по Краставиците и Пъпешите. [New effective compounds against scab on Cucumbers and Melons.]—Овощ. и Градинарст. [*Veg. Grg & Hort., Sofia*], *1957*, 6, p. 47, 1957.

Scab on cucumbers and melons (*Cladosporium cucumerinum*) [**35**, p. 623] has been exceptionally destructive in the last few years in Bulgaria in greenhouses. Spraying (every 8 days with a severe outbreak) before fructification and even before planting out with 0·25% captan and 0·35% zineb checked the disease.

Neely (R. D.). **A study of Fusarium root rot and wilt of Soybeans.**—*Diss. Abstr.*, **17**, 10, p. 2132, 1957.

In summer 1953 a new disease of soybeans caused by *F. orthoceras* [cf. **35**, p. 66] was reported from north central Missouri on heavy, river bottom soils. The symptoms were slight chlorosis, rapid wilting and subsequent drying of the leaves which remain attached to the stem, necrosis of lateral roots, and characteristic discoloration of the vascular system of root and stem. Certain strains were tolerant or genetically resistant. Other field crop plants were not affected. The fungus tolerated a wide pH range (2–11) and temperatures from 10°–40° C. A flooding inoculation technique was used, this being most comparable to the natural mode of infection. Variation in pathogenicity within *F. orthoceras* was noted. Wilt production is ascribed to a non-volatile substance, toxic to soybean plants, which is produced by the fungus grown on Richards's solution, later replaced by distilled water for 48 hr.

Kurata (H.) & Kuribayashi (K.). **Soy Bean scab caused by Sphaceloma glycines sp. nov.**—*Ann. phytopath. Soc. Japan*, **18**, 3–4, pp. 119–121, 3 fig., 1954. [Received Apr. 1958.]

A destructive disease of soybean, discovered in the Nagano Prefecture, Japan, in 1947, was found to be caused by a fungus here described and named *S. glycines* Kurata & Kuribayashi. The conidia measure 4·7–13 (5·5) × 2·1–5·6 (2·3) μ. Hyperplastic scabs are formed, those on the leaves being circular to irregular, up to 4 mm. diam., sometimes coalescent; on the stem, elliptical, up to 2 cm. long; and on the pods becoming dark olive to black with a lighter centre and red-brown margin. The fungus was weakly pathogenic to *Dolichos lablab* on inoculation, but not in the field, and proved unable to infect 7 other crop legumes tested.

Chamberlain (D. W.). **Maintaining bacterial organisms in Soybean leaves.**—*Plant Dis. Reptr*, **41**, 12, pp. 1039–1040, 1957.

At the U.S. Regional Soybean Laboratory, Urbana, Illinois, *Pseudomonas glycinea* [**37**, p. 387] was maintained in inoculated leaves of Lincoln soybeans in the refrigerator at 5–7° C. for 7 years without loss of viability or virulence. There was no perceptible difference between bacteria stored at this temp. and those at −10°. The method was also successful for the storage of *P. tabacum* in soybean leaves, virulence being maintained for 3½ years.

Reid (P. H.) & York (E. T.). **Effect of nutrient deficiencies on growth and fruiting characteristics of Peanuts in sand cultures.**—*Agron. J.*, **50**, 2, pp. 63–67, 5 fig., 1958.

The dry weights of above-ground parts of groundnut plants grown in sand culture at N. Carolina Agricultural Experiment Station were significantly reduced when any of the 9 elements tested was omitted, and, except for Mn and Mo, flowering also. Pod formation was prevented by deficiency of N, Ca, or B. Plants deprived of Cu or Mo from the time of planting produced mature fruits but none developed with the other deficiencies unless these were remedied early in the season, and even then growth and fruit formation were reduced. Withholding P, Mn, and Mo at

early flowering failed to reduce the formation of pods. Symptoms of Ca, Mg, B, and S deficiency appeared rapidly.

HARRIS (H. C.) & GILMAN (R. L.). **Effect of boron on Peanuts.**—*Soil Sci.*, **84**, 3, pp. 233–242, 3 fig., 1957.

The methods and results of tests to determine the effects of soil amendments with B (1·7 lb./acre) on Early and Dixie Runner groundnuts on a fine sandy soil at Florida Agricultural Experiment Station in 1955–6 are described and tabulated [cf. **36**, p. 382]. The treatment produced large increases of nuts, especially of Early Runner, and greatly improved their quality, virtually eliminating the hollow-heart defect which was prevalent in the untreated plots.

AGNIHOTHRUDU (V.). **Fungi isolated from rhizosphere. III.**—*J. Indian bot. Soc.*, **36**, 4, pp. 486–490, 3 fig., 1957.

The following are included among 13 spp. of Mucorales isolated at the University Botany Laboratory, Madras [cf. **35**, p. 232], from the rhizosphere of pigeon pea (*Cajanus cajan*) [**33**, p. 626]: *Rhizopus arrhizus*, *R. nodosus*, and *Choanephora cucurbitarum*.

PAWAR (V. H.) & PATEL (M. K.). **Phomopsis blight and fruit-rot of Brinjal.**—*Indian Phytopath.*, **10** (*1957*), 2, pp. 115–120, 1958.

Phomopsis disease (*P. vexans*) [**8**, p. 698] is severe on eggplant in the Belgaum district of Bombay State but did not attack any other host plants tried. The min. temp. for growth lies between 7 and 11° C., the opt. near 28°, and the max. between 35 and 40°.

GROMOV (N. G.). Выращивание Шампиньонов. [Mushroom growing.]—Природа [*Nature, Priroda, Moscow*], *1957*, 8, pp. 93–95, 2 fig., 1957.

This popular article for commercial growers and amateurs includes details on the preparation of beds and composts, conditions for indoor and field cultivation, and recommendations for planting.

POPOV (P.) & KONISHEV (P.). Повече внимание към производството на Гъби. [More attention to Mushroom growing.]—Овощ. и Градинарст. [*Veg. Grg & Hort., Sofia*], *1957*, 6, pp. 43–46, 1957.

This is a review of the Polish State plan for mushroom growing, recommended for Bulgaria, where conditions are well suited to this industry. Technical details are given concerning the production of spawn.

BLATTNÝ (C.) & PILÁT (A.). **Možnost' existence viros u vyšších Húb.** [The possibility of existence of viruses in Mushrooms].—*Čes. Mykol.*, **11**, 4, pp. 205–210, 1 fig., 2 graphs, 1957. [German summary.]

The authors attribute 'mummy' disease [cf. **36**, p. 231], excrescences, and albino forms of mushrooms to virus infection. Tissue from diseased mushrooms, inoculated to healthy ones, reproduced the symptoms of 'mummy' disease. Further studies are in process.

FOGLIANI (G.). **Ricerche sperimentali sulla 'degenerazione infettiva' della Vite. II. Esame della trasmissione di singoli sintomi della 'degenerazione' per innesto. III. Esame della trasmissione per talea di singoli sintomi della 'degenerazione'. IV. Esame della trasmissione per innesto di sintomi presenti su piante degenerate, con marze e con talee senza sintomi, raccolte dalle piante degenerate. V. Esame della trasmissione per talea di sintomi presenti su piante degenerate, con talee senza sintomi, raccolte dalle piante degenerate.** [Experimental researches on infectious degeneration of the Vine. II. Examination of the transmission of the separate symptoms of 'degeneration' by grafting. III.

Examination of the transmission of the separate symptoms of 'degeneration' by cuttings. IV. Examination of the transmission by grafting of symptoms present on degenerated plants with symptomless scions and cuttings taken from degenerated plants. V. Examination of the transmission by cuttings of symptoms present on degenerated plants, with symptomless cuttings taken from degenerated plants.]—*Ann. Fac. Agr. Milano*, N.S., **5**, pp. 59–84; 91–120; 187–215; 217–239, 1956.

Further work at the University of Milan [**35**, p. 579; **36**, p. 166, *et passim*] showed that in general a large group of symptoms was transmitted by grafting or developed later, when present on the scion, the stock, or cuttings, or on degenerated plants from which symptomless grafts and cuttings were taken. These symptoms, which are listed, are considered to be related to the disease, and are regarded as important for purposes of diagnosis. A second group of symptoms which are not, or are only very seldom, transmitted by grafting are considered not to be directly related to the disease.

Baldacci (E.) & Refatti (E.). **La lotta contro le due maggiori ampelopatie : Peronospora (Plasmopara viticola) e Oidio (Uncinula necator) in relazione alla conoscenza dei periodi di incubazione e dei cicli biologici. I. L'applicazione del calendario d'incubazione nei confronti dell' invasione primaria di Peronospora (1950–1955). II. Analisi dell' epidemia peronosporica nelle infezioni secondarie (1950–1955).** [The control of the two principal vine diseases: *Peronospora* (*Plasmopara viticola*) and *Oidium* (*Uncinula necator*) in relation to a knowledge of the incubation periods and the life-cycles. I. The application of the incubation calendar in relation to the primary invasion of *Peronospora* (1950–1955). II. An analysis of the *Peronospora* epidemic in the secondary outbreaks (1950–1955)].—*Ann. Fac. Agr. Milano*, N.S., **5**, pp. 35–57; 157–178, 1956. [English summaries. Received 1958.]

The authors review the data on vine downy mildew (*Plasmopara viticola*) collected by phytopathological observatories in the Po valley during 1950–55, with special reference to the functioning of the incubation calendar for forecasting outbreaks [**36**, p. 302]. Once more it is confirmed that the problem of control is more individual than general. Over 15 years the first infections never appeared before 10 May, or in advance of the forecast date. The incubation period before secondary outbreaks occur also coincides with the calendar or is longer. It appears that control measures should be continued beyond the middle of July, contrary to present practice.

Raykov (E. B.). Антракнозата по Лозата. [Anthracnose on Vine.]—Лозарство и Винарство [*Vitic. & Wine-Mak., Sofia*], *1956*, 4, pp. 210–212, 1956. [Abs. from *Referat. Zh. Biol., 1958*, 4, p. 197, 1958.]

Vine anthracnose [*Elsinoe ampelina*], very severe in several S. and W. regions of Bulgaria, was checked to some extent by spraying 3–4 times in the spring with 1–2% Bordeaux mixture and in the late autumn, after leaf fall, with 30% ferrous sulphate +2% sulphuric acid.

Martinov (S. I.). Сивото гниение по Гроздето. [Grey mould on Grapes.]—Лозарство и Винарство [*Vitic. & Wine-Mak., Sofia*], **5**, 4, pp. 212–214, 1956. [Abs. from *Referat. Zh. Biol., 1958*, 4, p. 197, 1958.]

Botrytis cinerea develops on grapes in Bulgaria as a result of lack of ventilation of unpruned vines. Sulphur dioxide and formalin vapour checked the disease in the fields. Fumigating the storage buildings with SO_2 at 40–60 g./cu. m. was very effective, but for preventing damage to wine prepared from diseased grapes sulphurization is essential.

Berättelse över Nordiska Jordbruksforskares Förenings tionde kongress-Stockholm 1956. [Report of 10th congress of the Scandinavian Agricultural Scientists' Society—Stockholm 1956.]—*Nord. JordbrForskn.*, **38** (*1956*), 3–4, pp. 137–531, 1957.

Included in the soil section (pp. 197–303) are 2 general papers by A. Sorteberg: 'Molybdenum deficiency in plants' (pp. 210–213) and 'Magnesium fertilization' (pp. 214–218).

Of papers of a general nature in the section on plant pathology and agricultural zoology (pp. 397–463) is one by I. Jørstad (pp. 411–412) on 'Foot-rot (*Ophiobolus graminis*) in cereals in Norway' [**36**, p. 521] during 1952–55.

U. Haegermark (pp. 415–419) examined the fungicidal effect of nitro-chalk on *Cercosporella herpotrichoides* [**35**, p. 819]. Laboratory tests in 1954 and 1956 showed that the fungus is sensitive to nitro-chalk equivalent to a few hundred kg./ha.

O. Pohjakallio (pp. 425–427) reviewed 'The importance of antagonistic organisms in the restriction of plant disease epidemics'. Referring to substances in cultivated plants which are toxic to fungi and bacteria, and which play an important part in developing host resistance, mention is made of 2(3)-benzoxazolinone [**35**, p. 821]. The effect of prevailing conditions on antagonists was illustrated by experiments at the Plant Pathology Institute, Helsinki University. Of 179 bacterial isolates from clover 55%, and 30% of the fungal isolates, had an antagonistic effect on the clover rot fungus (*Sclerotinia trifoliorum*) [**36**, p. 46]. Most of the antibiotic bacteria were effective also at low temp., almost 0° C.

Aerobacter sp. was strongly antibiotic on an agar substrate containing starch or sorbitol in addition to salts and peptone, but was only slightly so with other carbohydrates, such as dextrin, saccharose glucose, or manitol. *S. trifoliorum* was able to utilize all these carbohydrates, whereas the *Aerobacter* could not utilize the starch and sorbitol. *S. trifoliorum* and *Aerobacter* proved mutually antagonistic and the nature of the substrate decided which survived.

Recent investigations have shown that many bacteria and fungi, e.g. *Trichoderma viride*, *Trichothecium roseum*, and certain *Mucor* and *Penicillium* spp., parasitize *S. trifoliorum* sclerotia [loc. cit.]. During the rainy summer of 1954 95% of the *S. trifoliorum* sclerotia placed in the field were destroyed, compared with only 2% in the dry summer of 1955.

H. Røed presented a survey of 'Parasitic winter damage to pasture plants and autumn cereals in Norway' (pp. 428–431) in recent years, of which the most important was caused by *S. trifoliorum* [**35**, p. 894]. A general paper on 'Ring rot (*Corynebacterium sepedonicum*) in potatoes' (pp. 435–437) [**36**, p. 785] in Sweden and its control was contributed by I. Granhall. D. Lihnell, reporting 'Investigations into rust-rings in potato' (pp. 443–445) described field and greenhouse studies in which symptoms of this disease [spraing: cf. **37**, p. 108], of considerable importance in Sweden, occurred in 2nd and even in 3rd and 4th generations of tubers. It was suspected that it may be related to, though not identical with, potato stem-mottle virus [**32**, p. 145]. Investigations are being continued.

[For results in this report already noticed see **35**, pp. 708, 745; **36**, p. 702.]

Fedotova (Mme T. I.). Влияние силикатных бактерий на заболеваемость и урожай растений. [The influence of silicate bacteria on the susceptibility to diseases and yield of plants.]—*Plant Prot., Moscow, 1957*, 3, pp. 45–46, 1957.

In experiments at the Nosovsky Research Station introduction of silicate bacteria into the soil very effectively reduced [unspecified] rusts on wheat and barley, loose smut [*Ustilago maydis*] on maize, *Ascochyta* [*pisi*: **37**, p. 333] and a bacteriosis on peas, *Fusarium* [*oxysporum*] and a bacteriosis on lupin, and cucumber bacteriosis [*Pseudomonas lacrymans*: **26**, p. 279], decreasing the diseases 2–3 times and increas-

ing yields 20–30%. In the Odessa area similar experiments proved effective against maize smut, which is very severe in this area, reducing losses by over 50%. The same treatment against *Fusarium* [*lini*: **37**, p. 24] on flax reduced infection to 7% and increased yield 16%.

Garrigues (R.). **Des végétaux aux animaux : cécidies et tumeurs.** [From plants to animals: galls and tumours.]—*Rev. Quest. sci., 1957*, pp. 523–540, 8 fig., 1957.

The author compares and contrasts the histology, cytology, and mode of origin and development of the plant galls caused by *Agrobacterium tumefaciens* with human and animal cancer.

Symposium on plant tumours.—*Proc. nat. Acad. Sci., Wash.*, **44**, 4, pp. 338–368, 10 fig., 1 diag., 7 graphs, 1958.

The introduction to this symposium in commemoration of the 50th anniversary of the published description of *Bacterium* [*Agrobacterium*] *tumefaciens* and a concluding section are contributed by A. J. Riker (pp. 338–339 and 367–368). P. R. White (pp. 339–344) describes the appearance and discusses the etiology of tumours on spruce (*Picea glauca* and *P. sitchensis*) which differ so markedly in structure from the 'burls' associated with crown gall as to suggest a totally different origin. They are believed to be sectorial chimaeras arising from a series of local somatic mutations with some common cause. *P. glauca* is affected along the N. Atlantic seaboard from Booth Bay Harbour, Maine, to Labrador, near sulphur springs in the Canadian Rockies, and along the N. shore of Lake Superior, and both along the N. Pacific coast from Puget Sound to Alaska.

A. C. Braun (pp. 344–349) postulates a physiological basis for the autonomous growth of the crown-gall tumour cell, consisting in the permanent activation of a series of growth substance-synthesizing systems, the products of which are concerned specifically with growth accompanied by cell division.

R. M. Klein (pp. 350–353) describes the methods used in the study of the activation of metabolic systems during tumour-cell formation [see below].

A. C. Hildebrandt's paper on the stimulation or inhibition of virus of infected and insect-gall tissues and single-cell clones (pp. 354–363) contains references to crown gall and tobacco mosaic virus.

Up-to-date knowledge on wound tumour [big-vein] virus of sweet clover (*Melilotus alba* and *M. officinalis*), *Rumex acetosa*, and other plants is presented by L. M. Black (pp. 364–367).

Klein (R. M.) & Knupp (J. L.). **Sterile induction of crown-gall tumours on Carrot tissues in vitro.**—*Proc. nat. Acad. Sci. Wash.*, **43**, 2, pp. 199–203, 1957.

Further refinements are described in the general techniques for studying the synthesis and activity of the tumour-inducing principle which appears to be a metabolic product of virulent crown-gall bacteria (*Agrobacterium tumefaciens*) [**35**, p. 514 and see above]. The transformation of normal into tumour cells can occur only with the co-operation of a 'heat-labile' synthesis factor present in a number of plants, including beet, parsnip, and carrot roots, potato tubers, and [unspecified] herbaceous stems. Both direct and indirect evidence suggest that the tumour-inducing principle [cf. **36**, p. 178] is a deoxyribonucleic acid.

Hall (I. M.) & Dunn (P. H.). **Entomophthorous fungi parasitic on the spotted Alfalfa aphid.**—*Hilgardia*, **27**, 4, pp. 159–181, 14 pl., 1957.

Of the 5 fungi found parasitizing the lucerne aphid (*Therioaphis maculata*) in California [cf. **36**, p. 470], 4 are described as new: *Entomphthora obscura*, *E. ignobilis*, *E. exitialis*, and *E. virulenta*. The 5th was identified as *E. coronata* [**27**, p. 321]. *E. exitialis* is also reported from India, Iraq, Israel, and Louisiana, and *E. virulenta* from Israel.

De Bruin (H. J.). **De rentabiliteit van de bestrijding van planteziekten.** [The profitability of plant disease control.]—*Landbouwvoorlichting*, **15**, 6, pp. 266–270, 1958.

The subject is discussed under the aspects of (*a*) what control measures can profitably be carried out, and (*b*) how profitability can be enhanced.

Shapiro (S.). **Devices and techniques for use in fungicide testing.**—*Amer. Dyest. Reptr*, **47**, 3, pp. 73–78, 13 fig., 1 diag., 1958.

The following procedures, developed during the past decade, possess various advantages over standard methods and have helped to obtain more reproducible results in the evaluation of fungicides at the U.S. Army Engineer and Research Laboratories, Fort Belvoir, Virginia. I. A cabinet for the horizontal drying of test fabrics to reduce uneven distribution of the fungicide by gravity. II. Conditioning and storage trays constructed in such a way as to permit a maximum number of samples to be spread out singly in a minimum amount of space ($17 \times 25 \times 18$ in.), which provides nearly 30 sq. ft. drying or storage accommodation in a constant temperature and humidity room. III. Prevention of sample slippage in the jaws of tensile strength machines by vulcanizing a layer of rubber to the contact surface of each removable jaw. IV. A cutting die for the preparation of fabric strips for chemical analysis. V. A down-draught ventilator system for use with the laboratory padder. VI. A template and a finger-clip ruler for the rapid preparation of ravelled fabric strips. VII. A rapid method for outlining test squares on paper or fabrics with a metal marking die to impoint the lines and a rubber stamp pad for inking. VIII. An atomizing type spray nozzle, made by drilling a 0·028 in. hole in a brass plug with a No. 70 drill, for wetting soil-burial beds. IX. A special fabric incorporating vat-dyed warp yarns at definite intervals, designed to facilitate the cutting and ravelling of test strips [**37**, p. 75]. X. A method for evaluating [unspecified] fungus growth on large areas, e.g., painted panels, based on the use of a template to divide a large area into a number of smaller ones [**37**, p. 333].

Somers (E.). **Studies of spray deposits. III. Factors influencing the level of 'run-off' of copper fungicides.**—*J. Sci. Fd Agric.*, **8**, 9, pp. 520–526, 4 graphs, 1957.

In further investigations [cf. **37**, p. 14] Burgundy and Bordeaux, both colloidal mixtures, were used as Cu fungicides (Cu conc. 0·25%). The wetters used were: (1) sodium dioctyl sulphosuccinate, (2) sodium dinonyl sulphosuccinate (both anionic), the polyethylenoxy (non-ionic) agents (3) F_{10} and (4) F_{20} (condensates of *iso*-octyl-*o*-cresol with, respectively, 10 and 20 molecules of ethylene), and (5) cetylpyridinium chloride (a recrystallized product of m.p. 82–83°). Leaves of Giant Windsor broad bean and Majestic cauliflower from the glasshouse, Majestic potato and laurel from the field, and cellulose acetate sheet 0·6 mm. thick, vertically placed, were the surfaces sprayed, using an aerograph MP atomizer. They were allowed to drain, dried, and sampled chemically for Cu deposit.

Levels of deposits always reached a constant value at 'run-off' point. Increase in conc. of wetter (2) between 0·05 and 0·17% (w/v) decreased Cu deposits from Burgundy on laurel, on upper and lower surfaces of bean, and on cellulose, and from cuprous oxide on cauliflower. Increasing conc. of non-ionic and cationic wetters with Burgundy had no effect on the level of deposit, with the exception of (5) on laurel. The Cu deposits, except when (2) was used, were heavier than those from other commercial fungicides of comparable Cu conc.

Increase in spray viscosity reduced the deposit, increase in Cu. conc. to 0·5% increased the deposits from Burgundy and Bordeaux, but addition of wetter (2) gave constant deposit values for increasing Cu conc. The deposits from Burgundy on the different test plants and the corresponding wettabilities were: potato $>$ bean $>$ laurel.

Lukens (R. J.) & Sisler (H. D.). **Chemical reactions involved in the fungitoxicity of captan.**—*Phytopathology*, **48**, 5 (1), pp. 235–244, 7 graphs, 1958.

A further contribution from the University of Maryland, College Park [cf. **35**, p. 835], indicates that the trichloromethylthio group by attachment to vital cellular components through S or by acting through a phosgene intermediate could be responsible for the fungitoxicity.

Rombouts (J. E.) & Sijpesteijn (Antje K.). **The chemotherapeutic effect of pyridine-2-thiol-*N*-oxide and some of its derivatives on certain plant diseases.**—*Ann. appl. Biol.*, **46**, 1, pp. 30–36, 1958.

In studies at the Agrobiological Laboratory 'Boekesteyn', 's Graveland and the Institute for Organic Chemistry T.N.O., Utrecht, the above substance (I), its Cu chelate (II), and its carboxymethyl derivative (III) inhibited the in vitro germination of *Botrytis fabae* and *Cladosporium cucumerinum* conidia at 0·02, 0·02, 100 and 0·05, 0·05, and 200 p.p.m. respectively. I was phytotoxic at 50 p.p.m., but not II or III. Bioassay of the root sap of cucumber seedlings, the primary leaves of which were dipped in 80 or 200 p.p.m. solutions of the compounds, gave doubtful evidence of translocation from the leaves as the roots of the controls were found to contain a substance fungicidal to conidia of *Sclerotinia fructicola.*

Painting one or both of the cotyledonary leaves of cucumber seedlings or of the 2 leaflets of broad bean seedling leaves with the compounds at 100–10,000 p.p.m. indicated protection of cucumber against *C. cucumerinum* by I and II, but to less extent by III, whereas I and III protected the broad bean against *B. fabae*, but II did not. Compounds I and III gave some evidence of translocatability, but not II. Root applications produced no therapeutic effect. I produced a volatile fungicide that plays a part in its chemotherapeutic activity. The chemotherapeutic effect of III, itself relatively non-fungitoxic, is considered to result from its giving rise to I in the plant.

Spraying machinery for estate use.—*R.R.I. Plant Bull.* 36, pp. 59–65, 12 fig., 1958.

Brief, popular descriptions are given of a number of commercial spraying-machines regularly used at the Experiment Station, Rubber Research Institute, Malaya, including hand, knapsack, and bucket sprayers, the latter including some power-operated machines.

Dorst (J. C.). **A quarter of a century of plant breeding in the Netherlands.**—*Euphytica*, **7**, 1, pp. 9–20, 1958. [Dutch summary.]

The author reviews and discusses the progress made in plant breeding in the Netherlands during the past 25 years, the points dealt with including changes in the varieties grown, new methods, modern equipment, and advice and material support to breeders. In the Netherlands new varieties, generally speaking, are developed only by private breeders.

Krasil'nikov (N. A.). Микробы-антагонисты и антибиотические вещества как факторы повышения устойчивости растений к инфекциям. [Microbial antagonists and antibiotic substances as factors increasing plant resistance to infection.]—Изв. Акад. Наук СССР [*Bull. Acad. Sci., U.S.S.R.*], Ser. Biol., **23**, 2, pp. 170–182, 1958. [English summary.]

In further studies [cf. **32**, p. 636; **36**, p. 546] at the Microbiological Institute, Academy of Science, U.S.S.R., it was demonstrated that micro-organisms may produce antibiotics at a high rate in soil containing organic matter, especially when stimulated by the presence of antagonists. Antibiotics may exist either in the free or absorbed state, the former being less abundant.

By introducing organisms and antibiotics into the soil it was found that chloromycetin is better preserved in the soil than any other antibiotic though the type of soil influences their stability. In meadow podzolic soil streptomycin was preserved for 20 or more days, in red and brown soil for only 1–3 days. Plants absorb antibiotics directly from the soil. There is an established relation between the quantity of antibiotic present and the amount absorbed. When penicillin was introduced into the soil at 5,000, 1,000, 500, and 100 units/ml. wheat plants absorbed 3,000, 500, 100, and 40 units/g., respectively. With pea and maize the quantity absorbed was up to 20% less. Antibiotics absorbed by plants increased their resistance to infection.

MULLER (W. H.). **The influence of antibiotics on micro-organisms causing fruit and vegetable rots.**—*Amer. J. Bot.*, **45**, 3, pp. 183–190, 1958.

In studies conducted at the University of California, Santa Barbara College, Goleta, to determine the biological spectrum of various antibiotics by means of the paper disk-diffusion method, streptomycin and neomycin had no effect on the fungi tested (including *Rhizopus nigricans* [*R. stolonifer*], 5 spp. of *Pythium*, 5 spp. of *Phytophthora*, *Aspergillus niger*, *Penicillium expansum*, *P. digitatum*, *P. italicum*, and *Alternaria tenuis*). Eulicin sulphate (particularly effective against *Penicillium* and *Aspergillus*), candicidin, nystatin (active against phycomycetes), filipin, amphotericin B, and candidin were effective against many fungi, but not against bacteria (including *Erwinia atroseptica*, *E. carotovora*, *E. aroideae*, and *E. chrysanthemi*), and thiolutin was both antibacterial and antifungal, either limiting or completely inhibiting the growth of 25 of 27 species tested.

Spores were more susceptible to the antibiotics than were the hyphae. When spores were treated with eulicin sulphate, percentage germination decreased, and the mycelium which subsequently developed sporulated less abundantly than that from untreated spores. The antibiotics were often less effective in the presence of agar or other adsorbing materials than they were in liquid media.

LOCKWOOD (J. L.). **A method for studying absorption of streptomycin by using leaf disks of Sedum purpureum.**—*Phytopathology*, **48**, 3, pp. 150–155, 2 graphs, 1958.

This method devised at Ohio Agricultural Experiment Station, Wooster, is alternative to that involving washing of treated plant parts and assay of expressed sap. Detached leaves of *S. purpureum*, the basal ends sealed with petrolatum, were sprayed on the under surface with streptomycin sulphate solution (generally 200 or 1,000 μg./ml.), and placed sprayed side up on water agar in closed Petri dishes for 24 hr., after which $\frac{1}{2}$ in. diam. disks were removed, stripped of the sprayed epidermis, and kept frozen until assayed on a nutrient agar (sprayed side down) against *Agrobacterium tumefaciens*. Leaf sap from frozen disks, applied to paper disks and assayed, gave values (expressed as μg. streptomycin/cm.^{2} leaf tissue) about twice those of the leaf disk assays, necessitating transformation of the leaf disk values. A min. of 11 disk samples was used for each observation. Streptomycin deposit was assayed on $\frac{1}{2}$ in. diam. paper disks placed among the leaves and sprayed together with them.

Hydrogen ion conc. and other leaf juice constituents had little effect on assay when buffered standards were used. When 0·1% tween 20 was added to the spray approx. 49% of the streptomycin deposited was absorbed, compared with 14% with water as the solvent, similar proportions being absorbed from both large and small deposits. Maintenance of a moist atmosphere increased absorption, but exposure to light or darkness made no difference. Despite some inconsistency in the estimates it was apparent that the age of the leaf and the portion sampled were responsible for variations in assay results, and these factors should be standardized in experi-

ments. Similar assay values were obtained with disks from washed leaves with the epidermis intact and with those from leaves stripped of epidermis.

Alferov (V. V.). Конференция по физиологии и биохимии микроорганизмов применяемых в промышлености. [Conference on the physiology and biochemistry of micro-organisms used in industry.]—Изв. Акад. Наук СССР [*Bull. Acad. Sci., U.S.S.R.*], Ser. Biol., **23**, 1, pp. 121–125, 1958.

This is a brief report of a conference organized by the Microbiological Institute of the Academy of Science, U.S.S.R., and the Soil Biology Faculty of Moscow University on 24–27 Apr. 1957, at which more than 80 Institutes took part and 60 reports were discussed.

Report of the Second Meeting of the Plant Protection Committee for the South East Asia and Pacific Region. Held in Kandy, Ceylon, 2–7 December, 1957.—28+6+2 pp., Rome, Food and Agriculture Organization of the United Nations, 1958. [Mimeographed.]

On pp. 9–17 of this report [cf. **36**, p. 573] details are given of the plant quarantine activities of the participating governments since the last meeting. On pp. 18–20 additional precautionary measures for regulating the importation and movements of plants are outlined, and a revised list of destructive pests and diseases not yet established in the Region is appended. The training of technical personnel is dealt with and general quarantine recommendations are noted. Annex B contains lists of plant diseases, pests, and weeds submitted by the participants.

Statutory Instruments, 1958, No. 308. Pests. Destructive Insects and Pests. The Wart Disease of Potatoes Order, 1958.—5 pp., London, H.M. Stationery Office, 1958.

This Order, operative from 5 Mar. 1958, consolidates with amendments the Wart Disease of Potatoes Order of 1941 [**20**, p. 624] and the General Licence Order, modifying its terms. The principal changes are that the Minister of Agriculture, Fisheries and Food may by notice declare and define land infested with wart disease (*Synchytrium endobioticum*), and that the destruction of infected potatoes must be carried out in accordance with the terms of a notice served by an authorized officer.

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, **6**, 5, pp. 77–79, 1958.

Lists are given of plants the import of which into the Territory of Papua and New Guinea [**36**, p. 636] is (*a*) prohibited, (*b*) prohibited except from Australia, or (*c*) restricted by a notice made under the authority of Quarantine Ordinance on 22 Nov. 1953 and published in *Papua & New Guinea Gaz.* 60, 1957 [see below].

Plant quarantine announcements.—*F.A.O. Pl. Prot. Bull.*, **6**, 6, pp. 93–95, 1958.

Decree No. 263, published in *La Gaceta*, **61**, 240, 1957, prohibits the importation into Nicaragua of cacao plants and parts from Panama, banana plants and parts from Honduras, where bacterial wilt (*Pseudomonas solanacearum*) [map 138] has been found, and citrus plants and parts from El Salvador.

Supreme Resolution No. 219 of 3 Oct. 1957, published in *El Peruano*, 4963, 16 Oct. 1957, prohibits the importation of potatoes into Peru except for experiment.

A notice of 22 Nov. 1957, under the title of Prohibition of Importation, published in *Papua & New Guinea Gaz.* 60, 28 Nov. 1957, sets out regulations governing the importation of plants of *Hevea* rubber.

Under the terms of Act No. 6968 of 1957, a list of plants and of diseases and pests the importation of which into Turkey is prohibited was published in the *Resmî Gaz.* 9766, on 26 Nov., 1957.

Proclamation No. 239 of 29 July 1957, published in *Govt. Gaz.* 5928, 16 Aug. 1957,

prohibits the introduction into the Union of South Africa of material of the genus *Manihot* from any country where cassava brown streak virus occurs.

POMA (EMILIA). **La simbiosi micorrizica nelle piante annue.** [Mycorrhizal symbiosis in annual plants.]—*Allionia* (*Boll. Ist. Orto bot. Univ. Torino*), **2**, 2, pp. 429–442, 8 fig., 1955. [English and French summaries. Received 1958.]

In fresh material mostly from wild but also from cultivated plants growing in the Botanical Gardens, Turin, and the immediate vicinity, the author found typical endotrophic mycorrhiza in 16 annual species, including *Callistephus hortensis*, *Carthamus tinctorius*, and *Phlox drummondii*. The behaviour of the endophyte in certain of the hosts is described.

LEVISOHN (IDA). **Mycorrhizal infection in Eucalyptus.**—*Emp. For. Rev.*, **37**, 92, pp. 237–241, 1 fig., 1958.

From the Botany Dept, Bedford College, London, a case of mycorrhiza formation by *Scleroderma* ? *verrucosum* [**35**, p. 477] in *E. gomphocephala* from Israel is described. Root material of 23 spp., 12 in the Macrantherae and 11 in the Renantherae, was examined. The ages of the plants ranged from 7-month seedlings of *E. regnans* (grown at Bedford College) to a tree at least 50 years old (*E. gunni* from E. Lothian, Scotland). Root samples of eucalypts from Benmore Forest (Argyll, Scotland), and from Hants, England, as well as from Kenya, Morocco, and Israel, were studied. Eight of the Macrantherae and 6 of the Renantherae were, at least in some instances, mycorrhizal, but no support was forthcoming for the assumption that the Renantherae are largely dependent on mycorrhizal infection for growth. Renantherous trees of respectable size from the Research Station, Ilanoth, Israel, were non-mycorrhizal, while at Benmore Forest both large and small trees of *E. coccifera* were substantially mycorrhizal.

PALMER (J. G.) & HACSKAYLO (E.). **Additional findings as to the effects of several biocides on growth of seedling Pines and incidence of mycorrhizae in field plots.** —*Plant Dis. Reptr*, **42**, 4, pp. 536–537, 1958.

This further report [cf. **37**, p. 122] on the seedlings remaining in the plots for a 2nd growing season, a total of 18 months, notes that those grown in the methyl bromide plots were tallest and had the heaviest shoots. Nemagon suppressed growth. Mycorrhizal formations were found in all seedlings.

WRIGHT (E.). **Importance of mycorrhizae to Ponderosa Pine seedlings.**—*For. Sci.*, **3**, 3, pp. 275–280, 2 fig., 1957.

Following the destruction of mycorrhizal fungi by soil fumigation [cf. above] the growth of *Pinus ponderosa* var. *scopulorum* seedlings in a nursery in the Pacific Northwest was stunted and chlorotic. In field trials the survival of non-mycorrhizal seedlings was significantly poorer than that of normal mycorrhizal ones. Members of Boletaceae often form mycorrhiza with ponderosa pine [**23**, p. 410], e.g. they were formed when the soil was inoculated with *Xerocomus* sp.

VENKATA RAM (C. S.). **Production of ultraviolet induced mutations in Fusarium vasinfectum with special reference to fusaric acid synthesis.**—*Proc. nat. Inst. Sci., India*, Ser. B, **23**, 5–6, pp. 117–122, 1957.

At the University Botany Laboratory, Madras, spores of *F. vasinfectum* were irradiated with ultraviolet light and selected single spore cultures were examined for fusaric acid synthesis [cf. **36**, p. 778 and below]. Of 30 such strains which had remained stable through 10 transfers on potato dextrose agar and were considered to be mutants, 10 exhibited increased production of the acid while the remainder synthesized none at all.

Lakshminarayanan (K.) & Subramanian (D.). **Chromatographic detection and estimation of fusaric acid.**—*Experientia*, **13**, 9, pp. 350–354, 1 graph, 1957. [German summary.]

From the University Botany Laboratory, Madras, the authors describe the detection and quantitative estimation of fusaric acid [**35**, p. 387] by paper disk chromatography (*Arch. Biochem. Biophys.*, **49**, p. 396, 1954). The irrigated chromatograms are sprayed with rubeanic acid (0·1% in acetone) and the colour of the bands intensified by exposure to ammonia vapour. The average width of the Cu chelate band gives a measure of the quantity of fusaric acid in the sample.

Morton (A. G.), England (D. J. F.), & Towler (Daphne A.). **The physiology of sporulation in Penicillium griseofulvum Dierckx.**—*Trans. Brit. mycol. Soc.*, **41**, 1, pp. 39–51, 1958.

At the Akers Research Laboratories, Welwyn, Herts., *P. griseofulvum* in submerged culture in glucose-nitrate solution was most readily induced to sporulate at almost any age by removal to sub-aerial conditions. Sporulation could, however, be induced in the liquid medium by increasing the sugar content (primarily an osmotic effect), transfer to a N-free medium, a brief period of desiccation, or supplying Ca, Cu, or a factor present in crude commercial glucose. Under sub-aerial conditions the dominant factor determining sporulation is the emergence of hyphae into the air. The results of the submerged culture studies indicate that these aerial hyphae sporulate (*a*) because they are partially desiccated and (*b*) because their supply of assimilable N is reduced.

Sporulation in 4 other spp. of *Penicillium* and 2 of *Aspergillus* was induced by some, but not all of the factors mentioned.

Takagi (Y.). **Studies on the conidial colour change in Aspergillus fungi. Part II. The role of copper and halogen ions in the formation of green conidia.**—*J. gen. appl. Microbiol.*, **3**, 4, pp. 269–275, 1 col. pl., 1 fig., 1957.

In further studies with mutants of *A. sojae* and *A. oryzae* [**37**, p. 77] the yellow strain was able to take up sufficient Cu to produce green conidia only in the presence of halogen ions. Since yellow mutants absorbed much less Cu than those of other colours it was concluded that the production of green conidia is related to Cu uptake and that the addition of halogen ions restores a genetic defect in the Cu uptake system.

Riedhart (J. M.) & Porter (C. L.). **A unique color reaction of a Penicillium sector.**—Abs. in *Proc. Ind. Acad. Sci.*, **66** (*1956*), p. 63, 1957.

At Purdue University, Indiana, a sector from a culture of *P.* ? *herquei* changed from yellow to green upon exposure to light or to ammonium hydroxide vapour.

Jerebzoff (S.). **Rôle de diverses substances azotées sur le dévéloppement de Monilia fructicola.** [The role of various nitrogenous substances in the development of *Monilia fructicola*.] **Action de différentes sources azotées sur les zonations de Monilia fructicola.** [The action of different sources of nitrogen on the zonations of *Monilia fructicola*.]—*Bull. Soc. Hist. nat. Toulouse*, **91**, pp. 191–201, 2 graphs; pp. 248–262, 1 fig., 1956. [Received June 1958.]

In the 1st paper experiments are described which showed that linear growth of *Monilia* [*Sclerotinia*] *fructicola* [cf. **29**, p. 103] in culture is the same whether the fungus is grown in the presence of nitrates, urea, or ammonium tartrate. If the ammonium salts of strong acids are used, linear growth becomes retarded on the 4th day when the colonies are grown from spores 15 days old, but if spores 8 days old are used linear growth remains unaffected for some days more. Increase in

weight after 8 days is greatest with urea or ammonium tartrate as the N source. Complete darkness had virtually no effect on growth rate or on rate of increase in weight. Conidial formation was best in the presence of ammonium sulphate and pigment production best in the presence of ammonium nitrate.

The 2nd paper concerns evidence that light is necessary for the development of zonation [cf. **36**, p. 115 *et passim*] in colonies of *S. fructicola*; that urea in large quantities is required before this takes place; that the amount of zonation is not proportional to increasing dosages of urea; that the role of a substance, supposedly developed as a result of the exposure of the colony to light, is to induce elongation and intense ramification of the fertile conidiophores; and, finally, that the use of different forms of N would appear to provide a simple means of studying zonation.

SAPPA (F.). **La micoflora del terreno quale elemento strutturale delle comunità vegetali.** [The fungus flora of the soil as a structural element of plant communities.]—*Allionia* (*Boll. Ist. Orto bot. Univ. Torino*), **2**, 2, pp. 293–345, 6 fig., 5 graphs, 1955. [English summary. Received 1958.]

Detailed studies of a *Calluna* heath near Turin demonstrated that the composition of the fungus flora varied considerably from spot to spot, even among very uniform plant communities. Isolates of 44 taxa were obtained. The author was able to distinguish two groups, one regularly distributed and the other not. This suggests that such work should not be confined to a restricted area. A method is required that shall give data truly representative of the fungal population of the plant community.

PEYRONEL (B.) & DAL VESCO (GIOVANNA). **Ricerche sulla micoflora di un terreno agrario presso Torino.** [Researches on the fungus flora of an agricultural soil near Turin.]—*Allionia* (*Boll. Ist. Orto bot. Univ. Torino*), **2**, 2, pp. 357–417, 6 fig., 21 graphs, 1955. [English summary. Received 1958.]

From soil samples taken at depths of 0–60 cm. in an experimental field of the Centro Nazionale Meccanico Agricolo, Mirafiori, Turin, fields bearing various crops, and meadows, analysed by the soil suspension method, isolates of 96 taxa were secured, some of which are described and illustrated. Comparison between the different groups of fungi made by a new method of graphic representation indicated a somewhat xerothermic character in the local mycocoenosis, very similar to that described for a heathland soil in Victoria [**34**, p. 179].

The mycocoenoses of the soils studied (green-manured with lupin, crops of lupin and maize, stabilized meadow, and meadow in process of being reconstituted about a year after cultivation) were strikingly different; those from lupin and maize were the farthest removed from the mean in their composition, and that from the meadow was more markedly tropical in character than that from cultivated soil.

Almost all the fungus groups were at a max. at a 10 cm. depth and min. at 20 and between 30–40 cm., though *Aspergillus* spp. and *Penicillium* spp. tended to become more abundant at 50 cm. or more. The evidence indicated that a rapid readjustment of the fungus flora takes place after the soil has been cultivated. The mould species most frequently found were: *Penicillium expansum* (present in 47·4% of the samples), *Trichoderma lignorum* [*T. viride*] (in 44·7%), and *Cladosporium herbarum* (in 31·6%).

BUTLER (E. E.) & HINE (R. B.). **Use of novobiocin for isolation of fungi from soil.**—*Soil Sci.*, **85**, 5, pp. 250–254, 1 fig., 1958.

This is an expanded, tabulated version from the University of California, Davis, of a note already published [**37**, p. 75]. The minimal concentrations of novobiocin (in the proprietory product albamycin) inhibiting growth on potato dextrose agar were: *Phytophthora cactorum* 50 μg./ml., *P. citrophthora* 75, *Phytium arrhenomanes*

100, and *P. aphanidermatum*, *P. debaryanum*, *P. irregulare*, *P. oligandrum*, *P. ultimum*, *Phytophthora drechsleri*, *P. capsici*, and *P. parasitica* over 100. The antibiotic restricted the radial growth of most colonies but its action on *Rhizopus nigricans* [*R. stolonifer*] and *Trichoderma lignorum* [*T. viride*] was undependable. The numbers and kinds of fungi developing on novobiocin-PDA compared favourably with those on peptone dextrose agar supplemented with rose bengal [**34**, p. 49] and streptomycin.

Williams (D. E.) & Vlamis (J.). **Manganese toxicity in standard culture solutions.**—*Plant & Soil*, **8**, 3, pp. 183–193, 2 pl., 4 graphs, 1957.

Toxicity caused by Mn [cf. **14**, p. 535] and B developed in Atlas barley plants grown at the University of California in standard Hoagland culture solutions with Mn and B levels above 0·025 p.p.m. Symptoms were necrotic spots on older leaves ranging from freckles to blotches. The intensity of spotting increased with conc., the opt. for a given plant being dependent on a set of external conditions. Lettuce plants also developed slight necrotic spotting under the same conditions, but not tomato.

Pilát (A.). **Naše Houby.** [Our Fungi.]—335 pp., 120 col. pl. (by O. Ušák), 6 fig., Prague, Brázda, 1952. 106.40 Kčs.

Following a general account of the biology of the Agaricales and a section on mycorrhiza is a detailed study of 140 spp. of larger fungi found in Czechoslovakia, based on fresh and herbarium material.

[An English translation, *Mushrooms*, Amsterdam, Bijl, was published in 1954.]

Vido (J.). **Húby našich hôr a lúk.** [Fungi of our mountains and plains.]—110 pp., 124 col. fig., Bratislava, State Technical Publ., 1955. 39.50 Kčs.

Another account [see above] of the agarics of Czechoslovakia, in popular terms.

Brown (Lily R.). **Alfalfa, Pasto Bermuda y Papa como nuevos huespedes de hongos patogenos.** [Alfalfa, Bermuda Grass, and Potato as new hosts of pathogenic fungi.]—*Bol. Exp. agropec., Lima*, **6**, 2, pp. 12–13, 1957.

The following, reported from the Estación Experimental Agrícola de La Molina, Lima, Peru, are believed to be first host records: *Colletotrichum graminicola* on lucerne [cf. **33**, p. 637]; *Helminthosporium sativum* [*Cochliobolus sativus*] and *Curvularia lunata* on Bermuda grass (*Cynodon dactylon*) [cf. **35**, p. 680]; and *Curvularia* [?] *lunata* and *Phoma* [?] *solanicola* [cf. **33**, p. 314] on potato.

Hiratsuka (N.). **Revision of taxonomy of the Pucciniastreae.**—*Contr. Lab. Phytopath. Mycol. Tokyo Univ.* 31, 167 pp., 1958. [127 refs.]

This monograph, which brings up to date the author's earlier work [**16**, p. 63], treats the group with special reference to the Japanese Archipelago. In all, 154 spp. (110 in the 8 genera of the family [loc. cit.] and 44 in *Uredo*) are described in detail with keys to the spp. of each genus, a species list, and a host list.

Crossan (D. F.). **The relationships of seven species of Ascochyta occurring in North Carolina.**—*Phytopathology*, **48**, 5 (1), pp. 248–255, 4 fig., 1958.

At N. Carolina State College, Raleigh, cultural, morphological, and reciprocal pathogenicity studies were made with species of *Ascochyta* isolated in the State from legumes, *A. phaseolorum*; okra (*Hibiscus esculentus*), *A. abelmoschi*; cotton, *A. gossypii*; hollyhock, *A. althaeina*; tobacco, *A. nicotianae*; tomato and eggplant, *A. lycopersici*; and pepper (*Capsicum annuum*), *A. capsici* [cf. **31**, p. 365; **33**, p. 503]. It is concluded that the last 6 should be regarded as synonymous with *A. phaseolorum*. There were, however, marked differences in pathogenicity between European isolates of *A. phaseolorum* and *A. lycopersici* and those from N. Carolina

El-Ani (A. S.). **The genetics of Ceratostomella radicicola and the phytogenetic relationship between Chalaropsis and Chalara.**—*Amer. J. Bot.*, **45**, 3, pp. 228–232, 7 fig., 1958.

In studies at the Dept of Plant Pathology, University of California, Riverside, it was found that a grey mutant of *Ceratostomella radicicola* [**33**, p. 636] lacking macroconidia arose from the macroconidia-producing black strain, and a macroconidia-lacking tan mutant from the macroconidia-producing brown strain; both normal strains occur naturally on the roots of the date palm [in California: **21**, p. 195]. Each developed as a result of a single gene mutation which suppressed the formation of macroconidia. The loss of macroconidia thus changed a *Chalaropsis* state to one of *Chalara*.

Evidence was obtained that the colour of the macroconidia in any culture was always identical with that of the perithecia, both being dark or brown. Colour, compatibility, and macroconidial formation segregated independently.

Qazi (A.), Khan (S. A.), & Staffeldt (E. E.). **Identification of Rhizoctonia bataticola.**—*Pakist. J. sci. Res.*, **9**, 3, p. 118, 1957.

The fungus known as *R. bataticola* [*Macrophomina phaseoli*: **37**, p. 458] was isolated from cotton, okra [*Hibiscus esculentus*], and *Impatiens balsamina* at the Agricultural College, Tando Jam, on a variety of media. No spores were produced. On potato dextrose agar the smooth, spherical, or oval to oblong, jet-black sclerotia were $48–144 \times 48–152$ (av. 100, 77×72) μ from cotton; $40–88 \times 48–96$ ($70{\cdot}4 \times 61{\cdot}6$) μ from *H. esculentus*; and $48–80 \times 48–80$ ($65{\cdot}6 \times 60$) μ from *I. balsamina*. On the basis of these features the organism is referred to *Sclerotium bataticola*.

Thomson (A. D.). **Interference between plant viruses.**—*Nature, Lond.*, **181**, 4622, pp. 1547–1548, 1958.

At the Molteno Institute, University of Cambridge, virus interference was quantitatively estimated by comparing local lesion counts for a challenging virus on plants systemically infected with a related or an unrelated virus with numbers on initially healthy plants. In each of the following combinations on White Burley tobacco the number of challenging virus lesions was reduced to at most 50% of the number on the control plants (the systemic virus being indicated first): tobacco severe etch with cabbage black ring spot, tobacco necrosis B 1, or potato virus X strain *Br*; potato virus X strains AST 1 and 4 and X4, tobacco mosaic 'type' or masked strain, or cucumber mosaic with cabbage black ring spot; and cucumber mosaic with potato virus X or tobacco mosaic (ribgrass strain). The following combinations on *Nicotiana glutinosa* also resulted in a 50% reduction (at least) in lesions: tobacco severe etch or cucumber mosaic with tobacco mosaic (ribgrass or 'type'). With many combinations interference was indicated also by a change in the lesion type, usually a restriction in size. There was a significant increase in the number of lesions caused by the challenging virus on infected compared with healthy, as, for example, between potato virus Y and potato virus X.

Tinsley (T. W.) & Wharton (A. L.). **Studies on the host ranges of viruses from Theobroma cacao L.**—*Ann. appl. Biol.*, **46**, 1, pp. 1–6, 1958.

At the W. African Cocoa Research Institute, Tafo, Ghana, of 63 spp. in the Tiliales experimentally colonized with mealybugs (*Pseudococcus njalensis*) carrying viruses obtained from cacao (infection by which has proved possible only in plants of this order), 28 became infected by the New Juaben strain of the cacao swollen shoot virus [cf. **37**, p. 463 and below]. The host ranges of 7 other cacao viruses were all contained in that of the New Juaben strain; the viruses fell into 3 groups according to their host ranges.

The only W. African species of Tiliaceae susceptible were 4 *Corchorus* spp. [**33**, p. 219], including *C. olitorius*, which were so rapidly killed by each of the 8 viruses that they are unlikely to be important as natural hosts. W. African Bombacaceae were readily infected, the Sterculiaceae somewhat less so, but species susceptible enough to contract infection in the field are *Sterculia rhinopetala*, *Cola lateritia* var. *maclaudi*, *Hilgardia barteri*, and *Adansonia digitata*, which should be examined as potential sources of cacao viruses.

KNIGHT (R.) & TINSLEY (T. W.). **Some histological observations on virus-infected Theobroma cacao L.**—*Ann. appl. Biol.*, **46**, 1, pp. 7–10, 1 pl., 1958.

At the W. African Cocoa Research Institute cacao viruses [see above and below] from the Bisa, Kpeve, Bosumtwe, and Mampong areas of Ghana and the New Juaben strain of cacao swollen shoot, which did not protect against them, all produced different external symptoms in infected plants but similar effects internally. Symptoms occurred on the leaves only if these were still developing when infected. The viruses appeared to produce their effects generally by preventing cell differentiation. The tissues of chlorotic areas of leaves were undifferentiated and resembled in structure those of young, unexpanded leaves. In stem and root swellings the xylem and the phloem are both increased, but occur in the same proportions as in normal secondary thickening; no phloem necrosis was observed.

The anatomical effects of attack by these viruses do not appear to be sufficient to account for the death of cacao trees, but they may perhaps be complementary to the root necrosis which results from infection.

ATTAFUAH (A.) & TINSLEY (T. W.). **Virus diseases of Adansonia digitata L. (Bombacaceae) and their relation to Cacao in Ghana.**—*Ann. appl. Biol.*, **46**, 1, pp. 20–22, 1 pl., 1958.

Baobab (*A. digitata*) trees growing in the savannah region of the Northern Territories and in the Accra plains of Ghana were found to be infected by viruses [cf. above], the 3 most distinctive resembling the Kpeve cacao virus, though definite relationship could not be established. Baobabs in the rain forest, however, were not infected even though near infected cacao; hence it is considered unlikely that cacao swollen shoot originated from *A. digitata*.

ASLAM (M.) & AUSEMUS (E. R.). **Genes for stem rust resistance in Kenya Farmer Wheat.**—*Agron. J.*, **50**, 4, pp. 218–222, 1958.

The substance of this paper on the inheritance of resistance to stem rust [*Puccinia graminis*] has already been noticed [**37**, p. 530].

KRIVCHENKO (V. I.). О силикатны бактериях. [On silicate bacteria.]—*Plant Prot. Moscow, 1957*, 5, pp. 31–32, 1957.

Winter wheat sown in soil into which silicate bacteria [**37**, p. 571] were introduced was resistant to brown rust [*Puccinia triticina*: **37**, p. 345] and yields were increased. In 1955 after the introduction of 16 milliards bacteria/ha. the incidence of brown rust was reduced by up to 55%. The results are best when the bacteria are introduced immediately before sowing.

EFIMOVA (Mme N. S.). Влияние минеральных удобрений на поражаемость озимых Пшениц твердой головней. [The influence of mineral fertilizer on the control of bunt in winter Wheat.] –Тр. Алма-Атинск. зоовет. ин-та [*Trud. Alma-Ata zoovet. Inst.*], **9**, pp. 116–118, 1956. [Abs. from *Referat. Zh. Biol., 1958*, 5, p. 197, 1958.]

At the Kazakh University, U.S.S.R., bunt (*Tilletia levis*) [*T. foetida*] on the wheat var. Ferrugineum 29 [**36**, p. 460] was controlled by applying at first leaf an equal

mixture of superphosphate and KCl; a decrease of 35·6–40% in the final infection resulted.

ZEMANEK (I.) & BARTOS (P.). Новые способы борьбы с пыльной головней Ячменя. [New methods for the control of loose smut of Barley.]—Вест. Сельск. Науки [*J. agric. Sci., Moscow*], **3**, 1, pp. 128–133, 1958. [English and German summaries.]

Of the methods tested at the Prague-Rizíň Plant Research Institute, Czechoslovakia, in 1954–56 for the control of *Ustilago nuda* on barley, immersing the seeds of Gubitse 48/18, Ratbor'sky, and Proskovets ganatsky in 0·05% chloranil solution for 48 hr. at 22° [C.] reduced infected plants by 92·5–97·4% (the control had 800 infected ears in 10 sq. m.). Immersing the seeds in water for 64 hr. was very effective and also preliminary treatment with 0·1% chloranil solution followed by anaerobic storage [cf. **37**, p. 404] for 96 hr., which decreased infection by 95·1–100%. Good results were obtained by moistening (20 l. water/100 kg. seeds) followed by 96 hr. anaerobic storage and drying.

RANDALU (I. M.). Гельминтоспориоз Ячменя. [Helminthosporiosis of Barley.]—*Plant Prot., Moscow, 1957*, 5, p. 25, 1957.

A survey of barley grain by the Estonian Agricultural Experiment Institute showed up to 95% infection by *Helminthosporium sativum* [*Cochliobolus sativus*: map 322] in 1954. The best control was obtained with heat treatment, 53° C. for 7 min., and dusting with granosan. Early sowing was beneficial.

KUTSEVOL (E. A.). Особенности пузырчатой головни Кукурузы на юго-востоке. [The peculiarities of Maize smut in the south-western Ukr. S.S.R.]—*Plant Prot., Moscow, 1958*, 2, pp. 31–32, 1 fig., 1958.

A survey by the Institute of Plant Protection, Artemovsk, Ukraine, showed that maize smut [*Ustilago maydis*: **37**, p. 473] continues to decrease yields by 20% and more. The only hybrid recommended for local use is Uspekh, which however loses its resistance in the 2nd and 3rd generations.

VORONKEVICH (I. V.). Опасное бактериальное заболевание Кукурузы. [Dangerous bacterial disease of Maize.]—Природа [*Nature, Moscow*], *1958*, 5, pp. 84–86, 1 map, 1958.

In connexion with maize imported from U.S.A. into U.S.S.R. measures are taken for preventing the introduction of seed-borne diseases, particularly *B.* [*Xanthomonas*] *stewartii*. The author explains the virtual absence of this disease from U.S.S.R. on the grounds of low temperature (below the opt. of 30°[C.]) and the absence of the vector (*Chaetocnema pulicaria*). The hybrid Golden Cross Bantam is recommended for import as it is resistant to early infection, and at the same time is a good yielder.

GREEN (V. E.). **Observations on fungus diseases of Rice in Florida 1951–1957.**—*Plant Dis. Reptr*, **42**, 5, pp. 624–628, 3 fig., 1958.

The only serious rice disease in the Everglades area was blast (*Piricularia oryzae*) [**37**, p. 352], infection occurring both before and after formation of the grain. It was controlled by early planting. *Cochliobolus miyabeanus*, *Rhizoctonia oryzae* [**17**, p. 622], and *Cercospora oryzae* caused only slight damage. One outbreak of seedling blight (*Corticium rolfsii*) which killed 10% of the plants was arrested by early irrigation.

GALLARDO (R. C.). **Resistance of Lowland Rice varieties to Rice blast.**—*Philipp. Agric.*, **41**, 4, pp. 223–230, 1957.

Of the 21 vars. tested at the University of the Philippines for resistance to *Piri-*

cularia oryzae Inomay, Malaman, and Ac 440 Dr.260 had a 0·5 infection rating (scale: 0·5–5·0), and may be used as parent strains in breeding work. With all vars. intensity of infection varied with age of plant [cf. **37**, p. 352] and the incubation period, 4·7–8·6 days, was longest for the most resistant.

SRINIVASAN (K. V.) & VIJAYALAKSHMI (U.). **Piricularia oryzae Cav. on Arundo donax L.**—*Sci. & Cult.*, **23**, 9, pp. 490–491, 1 fig., 1958.

During the last few years in the neighbourhood of the Sugarcane Breeding Institute, Coimbatore, India, *A. donax* has been infected by a leaf spot in June, July, and August caused by a strain of *P. oryzae*, characterized by high temperature tolerance and the ability to infect *A. donax* and sugarcane besides rice.

QAZI (A. Q.), CHAND (A. A.), & STAFFELDT (E. E.). **Comparative study of different varieties of Jowar (Andropogon sorghum) as affected by Tolyposporium ehrenbergii and Colletotrichum sp.**—*Pakist. J. sci. Res.*, **9**, 3, pp. 117–118, 1957.

Of the 36 sorghum vars. under observation at the Agricultural College, Tando Jam, 9 tall ones of local origin were susceptible or highly susceptible to *C.* sp. [**32**, p. 493], 1 local was fairly tolerant, and 3 (1 local and 2 introduced) were highly tolerant. Of the introduced dwarf grain vars., 9 appeared very and 3 somewhat tolerant of *C.* sp. Among 9 introduced dwarf fodder vars., 6 were highly tolerant of *C.* sp.

Infection by *T. ehrenbergii* [loc. cit.] was very sparse owing to washing-off of the spore suspension by heavy rains. Two introduced dwarf grain vars. and 1 dwarf fodder were susceptible, while 3 dwarf fodder were reasonably tolerant.

KNORR (L. C.) & REITZ (H. J.). **Re-appraising Citrus rootstocks, with particular reference to their susceptibility to virus diseases. II. Rangpur Lime.**

KNORR (L. C.). **III. Rough Lemon (Citrus limon (L.) Burm. f.).**—*Citrus Mag.*, **19**, 12, pp. 14–15, 20, 22–23, 24–25, 2 fig., 2 graphs, 1957; **20**, 2, pp. 8–10, 21, 24–25, 7 fig., 1957.

In the 1st of these papers from Lake Alfred, Florida [cf. **37**, p. 476], the similarity of Rangpur lime to rough lemon, except in the appearance of the fruit, is noted and after an enumeration of its favourable features attention is drawn to its infection by a virus similar to citrus exocortis virus [**36**, p. 317; **37**, p. 41], which makes its use as a stock inadvisable at present.

In the 2nd paper attention is drawn to the undesirability of Florida rough lemon (FRL) seedlings not of nucellar origin and of certain vars. that do not react to virus as does the true FRL. These include sweet lime and Orlando tangelo, both susceptible to citrus xyloporosis virus, of which FRL is tolerant. FRL stocks are also tolerant of tristeza virus and citrus exocortis virus; psorosis virus seems to cause little harm.

When certain kumquat clones are budded to FRL a characteristic swelling, with cracking of the bark, develops below the union, recalling exocortis infection in trifoliate orange stocks, and there is a similar decline of the tops. This condition, called 'podagra', has not yet been shown to be transmissible, but it constitutes a possible threat to FRL.

YOSHII (H.) & KISO (A.). **Plant-virus transmission insects. I. Metabolism in Satsuma Orange infected with the dwarf disease transmitted by green broad-winged plant hopper. II. The metabolism of virus-transmitting plant hopper, Geisha distinctissima.**—*Virus (Japan)*, **7**, pp. 306–320, 1957. [Abs. in *Chem. Abstr.*, **52**, 11, col. 9329 b–e, 1958.]

In comparative studies at Ehime University, Japan, on Satsuma orange (*Citrus*

unshiu) infected by [citrus] dwarf [virus: *Bull. Tôkai-kinki agric. Exp. Sta.*, **1**, pp. 61–71, 1952], transmitted by (*a*) *G. distinctissima* and (*b*) grafting, the O uptake and respiratory quotient were smaller, succinic dehydrogenase activity stronger and cytochrome oxidase activity weaker in the leaves inoculated by either method than in those of healthy specimens. The degree of oxidative phosphorylation was diminished in infected leaves. Fractionation of P compounds revealed an increase of organic, lipide, and nucleic acid P and a decrease of inorganic and protein P.

The O consumption of viruliferous insects was about 30% less than that of non-viruliferous. The degree of oxidative phosphorylation was lower, succinic dehydrogenase activity stronger, that of alkaline phosphatase weaker, the content of organic and lipide P higher and that of inorganic, nucleic acid, and total P lower in the former than in the latter.

Black spot of Citrus.—*Agric. Gaz. N.S.W.*, **69**, 3, pp. 156–157, 1 fig., 1958.

Black spot (*Guignardia citricarpa*) [**36**, p. 525] is the most serious disease of Valencia orange fruit in coastal New South Wales, though not occurring inland. There are two types of lesion: (1) rusted depressions developing into small circular spots, brown and sunken in the centre, with a darker, raised margin, and a surrounding ring of green tissue; and (2) which appear later in the spring, the primary rust-red pits developing into large brown sunken lesions which may be $\frac{1}{4}$–$\frac{1}{2}$ in. diam., or even involve half or more of the fruit surface. On these the fructifications of the fungus appear. Three protective sprayings with 2–2–80 Bordeaux mixture are usually essential, even on reasonably vigorous trees.

Dippenaar (B. J.). **Concentric ring blotch of Citrus—its cause and control.**—*S. Afr. J. agric. Sci.*, **1**, 1, pp. 83–106, 8 pl. [2 col.], 1958. [Afrikaans and French summaries.]

A study of concentric ring blotch [cf. **35**, p. 283] at the Agricultural Research Institute, Pretoria, showed the causal agent to be the grey mite, *Calacarus citrifolii*. 'Lepra explosiva' in Agentina and 'nailhead rust' in Florida [leprosis: **30**, p. 465] are closely related to concentric ring blotch, each being caused by an eriophyid mite.

Lakshminarayanan (K.). **In vivo detection of pectin methyl esterase in the Fusarium wilt of Cotton.**—*Naturwissenschaften*, **44**, 4, pp. 93–94, 1957.

Using 1% apple pectin as a substrate the author compared pectin methyl esterase (PME) [see below] activity in root, shoot, and leaf homogenates from control plants of Karumganni K2 [cf. **37**, p. 479] and from plants inoculated with *F. vasinfectum*, sampled at the stage when typical symptoms of vein clearing and dechlorophyllation were apparent. PME activity was higher in all tissues of the diseased plants.

Lakshminarayanan (K.). **Adaptive nature of pectin methyl esterase formation by Fusarium vasinfectum Atk.**—*Physiol. Plant.*, **10**, pp. 877–881, 1957.

At the University Botany Laboratory, Madras, India, increased production of pectin methyl esterase [cf. **34**, p. 553; see above] was observed when a pathogenic strain of *F. vasinfectum* was cultured in Richards's solution with 1% pectin added. Culture filtrates were of an intense brown colour and of enhanced toxicity to susceptible cotton cuttings (especially with added Fe^{+3} at 10^{-3} M.).

Gogolev (P. A.). Формы Хлопчатника, невосприимчивые к вертициллиозу и гоммозу. [Cotton varieties resistant to verticilliosis and gummosis.]—*Plant Prot., Moscow, 1957*, 5, p. 24, 1957.

The Central Selection Station of the Cotton Research Institute, Moscow, recom-

mends the cotton hybrids C–1586, C–1584, and C–1590 for their combined resistance to *Verticillium dahliae* [**37**, p. 537] and *B[acterium]* [*Xanthomonas*] *malvacearum* [loc. cit.]. In trials during 1949–54 the first 2 were free from *Verticillium* infection compared with 42·3% in the susceptible 8196, while gummosis percentages were 2·1 and 1·6, respectively, compared with 83% for 108–F (control).

Gasiorkiewicz (E. C.). **Storage rots of Carnations.**—Abs. in *Phytopathology*, **48**, 5 (1), pp. 261–262, 1958.

During low temp. conditioning of cut flowers (for up to 4 weeks) and cuttings (up to 6 months) of carnations at 31° F., *Botrytis cinerea* was found to cause a water soaked flecking of the outer petals, followed by browning, matting of the petals, and sporulation of the fungus. A leaf rot was caused by *Alternaria dianthi*, lesions with purple margins being followed by necrosis. Stem rot due to *B. cinerea* originated as mycelial growth on the leaf. The pathogen in this case failed to sporulate at 31°, but did so readily at 40° or above. Sprays and dips with captan or zineb controlled rots on the cuttings.

Stathis (P. D.) & Plakidas (A. G.). **Anthracnose of Azaleas.**—*Phytopathology*, **48**, 5 (1), pp. 256–260, 1 fig., 1958.

A more detailed account, from Louisiana State University, of the disease of *Rhododendron* caused by *Glomerella cingulata*, already noticed [**36**, p. 647]. No ascigerous state was found either in culture or on the host. Both Cu and organic fungicides controlled the disease.

Casarini (B.). **La potatura come pratica fitosanitaria.** [Pruning as a phytosanitary practice.]—*Inform. fitopat.*, **8**, 2–3, pp. 18–37, 63 fig., 1958.

This paper includes illustrations and brief, popular descriptions of the different malformations produced on pome and stone fruit trees and vines associated with various diseases and disorders, to assist growers in recognizing and removing them by pruning during winter.

Christoff [Christov] (A.). **Die Obstvirosen in Bulgarien.** [The fruit viroses in Bulgaria.]—*Phytopath. Z.*, **31**, 4, pp. 381–436, 68 fig., 1958.

The differences between the 11 viruses (7 on *Prunus* and 4 on *Pyrus*) studied [cf. **18**, p. 745] are shown in a comprehensive table, giving hosts, mode of transmission (including insect vectors), incubation periods, relation with other viruses in the same host-plants, thermal inactivation points, inactivation by chemicals, spread in the host, spring symptoms, chemical changes in the fruit, fruit symptoms, sterility, and leaf symptoms. The susceptibility of host cultivars is given. Of the viruses described, most of which have been noticed in this *Review* [loc. cit.; **37**, p. 411], 3 were only fairly recently observed in Bulgaria: white mosaic of *Prunus cerasifera* caused by *Prunus* virus 10a (related to peach band mosaic or *Prunus* virus 10), also on *P. mahaleb* and sweet cherry, to which it was transmissible by budding; apple mosaic caused by *Pyrus* virus 4 (synonymous with *Pyrus* virus 2), easily transmissible by budding to wild and cultivated apple trees; and pear ring pattern mosaic caused by *Pyrus* virus 3 (*Annulus pyri*), which occurs only on pear. Also included, *inter alia*, are plum narrow-striped variegation caused by plum narrow-striped virus (a strain of plum pox virus) [**18**, pp. 189, 745], peach purple mosaic (equated with peach asteroid spot virus), and apple line mosaic caused by *Pyrus* virus 5.

Gilmer (R. M.). **A comparison of Apple mosaic virus isolates.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 262, 1958.

Of 5 virus isolates causing apple mosaic, 3 from New York and 1 from Washington were all similar but 1 from California differed in being transmissible mechanically

and by dodder and infecting a wider range of hosts by bud inoculation. It was recovered after inoculation into apple seedlings systemically infected by the other 4. Tobacco systemically invaded by the California virus was not protected against reinfection by the same strain or against tobacco streak virus.

Barrat (J. G.), Smith (W. W.), & Rich (A. E.). **Transmission of the dapple Apple virus.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 260, 1958.

Dapple apple virus [**36**, p. 327] was transmitted by bud grafting to several apple vars., requiring 2 seasons' growth for symptom expression.

Groves (A. B.). **The influence of timing and rates of usage of karathane on the control of Apple powdery mildew.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 262, 1958.

Karathane was applied to susceptible Rome apple, starting at late bloom and continuing until terminal growth ceased, at 4, 8, 12, and 16 oz./100 gal. at 7-, 14-, and 21-day intervals, during the period of infection by *Podosphaera leucotricha* [cf. **36**, p. 597]. Leaf infection counts were made after 9 weeks. Percentage control at the rates and timing used was 94·5, 98·4, 99, 99·7; 86·5, 87, 93·5, 95·9; and 58·4, 75, 86·7, 85·4, respectively. There was a break in dosage response between 8 and 12 oz., and in influence of timing, between 7 and 14 days.

Cole (M.). **Oxidation products of leuco-anthocyanins as inhibitors of fungal polygalacturonase in rotting Apple fruit.**—*Nature, Lond.*, **181**, 4623, pp. 1596–1597, 1958.

At the Imperial College of Science and Technology, London, active polygalacturonase and pectin-methylesterase were detected in the culture filtrate when *Sclerotinia fructigena* was grown in a synthetic medium. Investigation of the reasons for the presence of a firm brown rot [cf. **37**, p. 241] and the absence of polygalacturonase activity in tissues of Bramley's Seedling apples attacked by the fungus suggested that *S. fructigena* does secrete the enzyme, which attacks the pectic materials of the host tissue; but the fungus also produces polyphenoloxidase which, together with the same enzyme from the host, oxidizes the leuco-anthocyanins to a polymer which inhibits the polygalacturonase, possibly by a tanning action, before it has time to macerate the tissue and produce a soft rot. The oxidation of the leuco-anthocyanins, catechins, and other compounds causes the brown coloration.

Spencer (D. M.) & Wilkinson (E. H.). **A method of reducing the losses caused by Gloeosporium spp. in stored Apples.**—*Nature, Lond.*, **181**, 4623, pp. 1603–1604, 1958.

As complete control of *Gloeosporium album* and *G.* [*Neofabraea*] *perennans* [**37**, p. 47] on stored apples might be possible by preventing the infection of fruit by spores normally present on the surface at picking, a study was made of this method of approach at Wye College, Kent, where, during investigations into the fungicidal properties of certain chemicals, (2:4:5-trichlorophenoxythio) trichloromethane displayed conspicuous fumigant, antifungal properties. The effect of this compound was, accordingly, tested on lenticel rotting of Cox's Orange Pippin apples during storage.

After dipping the apples in a spore suspension of *N. perennans*, 2 sets of 9 trays were stacked vertically in polyethylene tents and placed in cold storage at 39° F., box liners impregnated with the compound being fixed to the under sides of the middle 3 trays. The experiment was begun on 7 Oct. 1957 and the amount of rotting was assessed on 4 Feb. 1958.

Only 25% of untreated fruits were without lesions, whereas 42·3% of those in the treated trays were free, the figure for the 3 middle trays being 60·2%. There was

an average of 3·4 lesions per fruit in the controls, 1·5 in the 18 trays, and 0·63 in the middle 3.

Current research and investigation.—*Orchard. N.Z.*, **31**, 1, p. 13, 1958.

In this note from the Plant Diseases Division and Fruit Research Station it is stated that the 2 major fungi causing ripe spot of apple in New Zealand are *Neofabraea perennans* and *Gloeosporium album* [cf. **37**, p. 88]. The former produces cankers, which are not readily seen, all over the trees, particularly on small pruning wounds. These constitute a major source of infection. *G. album* rarely produces cankers yet causes fruit infection as frequently as *N. perennans*: it is not yet known where the spores are produced.

A new disease of tree tomatoes [*Cyphomandra betacea*], causing hard, irregular, blackish, depressed areas on the fruits, is under study in the Bay of Plenty district, to which it is at present virtually confined. Affected tissue extends into the flesh of the fruit, which becomes hard, discoloured, and inedible.

HIAM (N. J.). **Control of storage scald in Granny Smith Apples.**—*Orchard. N.Z.*, **31**, 2, pp. 59–61, 3 fig., 1958.

In Auckland Granny Smith apples intended for storage at 32° F. are best picked during 8–22 May, whereas picking of those intended for dual temperature storage (38° until 8 June, then 32°) [**37**, p. 358] should begin much earlier, possibly 20 Apr. In a trial carried out in 1956 apples picked before these dates were much more susceptible to superficial scald [see below]. Later picking may be inadvisable on account of [unspecified] fungal rots or excessive oiliness. Oiled wraps are recommended if the fruit is to be stored after 1 Aug., whichever temperature system is used.

PADFIELD (C. S.). **Superficial scald: some methods of control, reported overseas, applied to New Zealand grown Granny Smith Apples.**—*N.Z. J. agric. Res.*, **1**, 2, pp. 231–238, 2 fig., 1958.

At the Fruit Research Division, D.S.I.R., Havelock North, satisfactory control of superficial scald on Granny Smith apples [cf. **36**, p. 194; **37**, p. 241 and above] kept in cool storage for 200 days was given by paper wraps containing 10–12% oil. After 200 days' storage partial control of senescent scald resulted from the use of wraps containing 15–20% oil. Re-wrapping the fruit with fresh, oiled wrappers after 3 months' storage did not improve control, nor did reduction of the storage temperature from 37–38° F. to 31–32° after 4 weeks' storage. Destruction of the cuticle by physical means (passing over a Benseman grader 6 times or rubbing with a cloth saturated with 95% alcohol) [cf. **32**, p. 680] increased the amount of scald and had a deleterious effect on the appearance of the fruit. Wiping the apples with ethyl alcohol reduced scald in one season, but had no effect a year later. Spraying 10 times with captan (3 lb./100 gal. to closed calyx, then 2 lb.) in place of S in an alternating thiram–S schedule had no effect on the development of scald in storage.

DRUMMOND-GONÇALVES (R.). **Programas de tratamento bem orientados.** [Well-directed schedules of treatment.]—*Biológico*, **23**, 12, pp. 237–240, 2 fig., 1957.

The following treatments are recommended for the control of *Cladosporium* [*Fusicladium*] *carpophilum* and *Monilinia* [*Sclerotinia*] *fructicola* on peach in São Paulo, Brazil. After thorough sanitation during the dormant period the trees should be sprayed, well before the inception of new growth, with lime-sulphur 1:8. During the growing period 1% Bordeaux mixture or 1:50 home-made lime-sulphur should be applied (*a*) just after the commencement of new growth, (*b*) on the appearance of the first fruits, and (*c*) at 2- or 3-weekly intervals until a month before ripening.

Vasil'kova (Mme A. K.). Бактериальный рак косточковых. [Bacterial canker of stone fruit trees.]—*Plant Prot., Moscow, 1958*, 2, pp. 39–40, 3 fig., 1958.

This is the 1st record of *Pseudomonas syringae* in the Ukraine, the disease being most severe on apricots. Many young trees were attacked in the autumn and the damage was very severe. Measures for its control are given and a soil application of 200 g./sq. m. of calcium hypochlorite is recommended.

Gilmer (R. M.) & McEwen (F. L.). **Insect transmission of X-disease virus.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 262, 1958.

In this technique for the rapid transmission of [peach] X-disease virus by leafhoppers, the source plant was *Vinca rosea*, which proved acceptable to a number of vectors over a long period and developed marked symptoms. Given a 5- to 10-day acquisition period and then fed on healthy *V. rosea* for 25 days, *Fieberiella florii*, *Scaphytopius acutus*, and *Gyponana striatus* transmitted the virus, symptoms appearing in 4–6 weeks. The virus could not be transmitted to aster seedlings by *F. florii*, *Macrosteles fascifrons*, or dodder.

Lewis (F. H.). **The 'Pfeffingerkrankheit' or 'rosette' disease in Pennsylvania Sour Cherry orchards.**—*Plant Dis. Reptr*, **42**, 5, pp. 563–567, 4 fig., 1958.

A virus disease of sour cherry (*Prunus cerasus*) in 2 Pennsylvania orchards reduced growth, caused rosetting of the leaves and buds, and killed the spurs and terminals. Yield was decreased and maturity of the fruits variable. Affected leaves were small and sparse, or asymmetrical, or bore well-developed enations. The symptoms suggest that this is the disease described as rosette (the name preferred) in Canada, also found in Oregon [**33**, p. 679] and New York [**37**, p. 488], and called Pfeffinger [cherry rasp leaf virus] in Switzerland.

Adams (R. E.) & Kessler (K. J.). **Rosette or 'Pfeffingerkrankheit' on Montmorency Sour Cherry in West Virginia.**—*Plant Dis. Reptr*, **42**, 5, pp. 568–572, 6 fig., 1958.

Rosette [? cherry rasp leaf virus: see above] was found in 1956 in 2 orchards in W. Virginia, where the most striking symptom was die-back.

Hamilton (J. M.) & Szkolnik (M.). **Control of Coccomyces hiemalis by systemic movement of cycloheximide semicarbazone in Sour Cherry following root or leaf absorption.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 262, 1958.

One soil application of 20 p.p.m. of semicarbazone derivative of actidione to 3-yr.-old Montmorency and English Morello cherries in pots or 5 p.p.m. on 2 consecutive days protected against foliage infection by *C.* [*Higginsia*] *hiemalis* inoculated 3 days after the initial treatment [cf. **35**, p. 832]. Inoculation 2 weeks later, after 8 new leaves had developed, gave no infection. Concs. of 100 p.p.m. or more were phytotoxic and actidione at equivalent concs. was more injurious and less effective than the derivative. Systemic movement of the derivative applied to terminal leaves was correlated with conc., tree growth rate, and leaf age, and was more active in the open than in the greenhouse. Translocation occurred from the treated leaf to the next in vascular alignment rather than to the next distal leaf.

Deep (Ira W.). **Reduction in incidence of crown gall of Mazzard Cherry following antibiotic treatments.**—*Plant Dis. Reptr*, **42**, 4, pp. 476–480, 1958.

A more detailed account of information already noticed [**36**, p. 333] on control of *Agrobacterium tumefaciens*.

Marrou (J.). **Efficacité de quelques fongicides dans la lutte contre la pourriture des Fraises, Botrytis cinerea Pers.** [The efficacy of some fungicides in the

control of Strawberry rot, *Botrytis cinerea* Pers.]—*Rev. hort., Paris*, **130**, 2223, pp. 1826–1827, 3 fig., 1958.

In a fungicide trial conducted by the Station Centrale de Pathologie Végétale, Versailles, strawberry plants given 5 applications of thiram (3·2 g./l. of active material) or captan (2·5 g./l.) from 6 Apr.–15 June [1957] yielded 201,000 g. and 194,750 g. of marketable fruit, respectively, as compared with 181,250 g. for untreated plots, in which some grey rot [cf. **36**, p. 771] was present. No rot at all developed in the plots treated with thiram. Zineb was not effective.

Kheladze (V. S.). Рак Инжира. [Fig canker.]—*Plant Prot., Moscow, 1957*, 5, pp. 35–36, 3 fig., 1957.

In Georgia, U.S.S.R., fig canker (*Phomopsis cinerascens*) has a very wide distribution, being carried by *Hypoborus ficus*. Diseased branches and trees should be destroyed and precautions taken against mechanical injuries.

Curl (E. A.) & Weaver (H. A.). **Diseases of forage crops under sprinkler irrigation in the Southeast.**—*Plant Dis. Reptr*, **42**, 5, pp. 637–644, 1958.

This is a part of a long-range screening programme to determine the adaptability of certain forage crops to irrigation in Alabama and other parts of the Southeast. The diseases which showed the greatest increase in severity under high-level sprinkler irrigation (+natural rainfall) during a 1-year period were *Pseudoplea trifolii* on intermediate white clover, yellow patch [str. of lucerne mosaic] virus and *Curvularia trifolii* on Ladino clover, and *Pseudopeziza medicaginis* on African lucerne, whereas *Erysiphe polygoni* on red clover and rust (*Puccinia rubigo-vera tritici*) [*P. triticina*] on orchard grass [*Dactylis glomerata*] were more prevalent in the low-level irrigation plots protected from rainfall.

Smith (J. D.). **The effect of dollar spot disease on the botanical composition of turf of Sea-Marsh Fescue.**—*J. Sports Turf Res. Inst.*, **9**, 33, pp. 322–323, 1957.

Where dollar spot (*Sclerotinia homoeocarpa*) in marsh fescue (*Festuca rubra* ssp. *rubra*) turf [cf. **37**, p. 494 and below] sown from seed is not controlled by cadmium chloride+urea the weakened fescue is partially replaced by resistant bent grass (*Agrostis stolonifera* var. *compacta*) present in the seed mixture.

Smith (J. D.). **Dollar spot-fungicide trial, 1956.**—*J. Sports Turf Res. Inst.*, **9**, 33, pp. 353–354, 1957.

The success of cadmium chloride+urea against *Sclerotinia homoeocarpa* has already been reported [**36**, p. 595, see above and below]. Griseofulvin (0·18 g./90 ml. water/9 sq. ft.) was not effective in this trial [cf. **36**, p. 701].

Smith (J. D.). **Cadmium chloride/urea for dollar spot control.**—*J. Sports Turf Res. Inst.*, **9**, 33, pp. 355–359, 1957.

In this 1-year trial on turf at 14 sites under playing conditions, the fungicide (as before [see above] except that 1% lissapol NBD wetter was added) was applied at a 100 gal./acre, the conc. being adjusted to give 8 g. or 4 g./1000 sq. ft. In most places the treatment was very effective in suppressing symptoms of *Sclerotinia homoeocarpa*, though eradication was not achieved. Where infection is severe or where there is a high proportion of susceptible fescue (*Festuca rubra* ssp. *rubra*) the full rate is recommended. In general the $\frac{1}{2}$-rate suffices to keep mild infection in check.

Smith (J. D.). **Fusarium patch disease fungicide trials, 1957.**—*J. Sports Turf Res. Inst.*, **9**, 33, pp. 360–363, 1957.

At the Sports Turf Research Institute, Bingley, Yorks., *Fusarium* patch disease

(*F. nivale*) [*Calonectria nivalis*] on New Zealand brown top [*Agrostis tenuis*] and South German mixed bent [*A. tenuis*, *A. stolonifera*, and *A. canina*], sown in spring 1956, was effectively controlled by fungicide 12 [see below] at 2–4 g./250 ml. water/25 sq. ft., cadmium chloride + urea [see above] at the same rate, verdasan (2 g.), and merfusan (20 g. dry). Of 4 antibiotics tested [cf. **36**, p. 701] only actidione and its semicarbazone derivative gave appreciable control, but both caused marked and persistent scorching of the turf.

Smith (J. D.). **A new fungicide formulation for Fusarium patch disease control.**—*J. Sports Turf Res. Inst.*, **9**, 33, pp. 364–366, 1957.

At the Sports Turf Research Institute, Bingley, Yorks., fungicide 12, a formulation composed of mercuric chloride (100 mesh; 15 parts by wt.), mercurous chloride (microfine; 30 parts), malachite green ANS (oxalate, fine ground; 5 parts), solid non-ionic wetting agent (non sticky; 1 part), and kaolin light (china clay; 49 parts) proved satisfactory for spraying and at 2 g./25 sq. ft. (approx. $2\frac{1}{2}$ oz./100 sq. yd.) was non-injurious, controlled established infections of *F. nivale* [*Calonectria nivalis*: see above], and prevented the appearance of *Corticium fuciforme*.

Smith (J. D.). **Corticium disease fungicide trial, 1957.**—*J. Sports Turf Res. Inst.*, **9**, 33, pp. 367–368, 1957.

Cadmium chloride + urea (4·2 g. Cd/1,000 sq. ft.), malachite green/Bordeaux mixture, fungicide 12 [see above], and actidione completely prevented the appearance of natural *Corticium* [*fuciforme*] infection in a sward composed of New Zealand Chewing's fescue [*Festuca rubra* var. *fallax*] with brown top [*A. tenuis*: cf. **33**, p. 429]. The organic mercurial phemox caused marked scorching, even at reduced strength.

Smith (J. D.). **Seed dressing trial, 1957.**—*J. Sports Turf Res. Inst.*, **9**, 33, pp. 369–372, 1957.

The emergence of Chewing's fescue (Oregon) [*Festuca rubra* var. *fallax*: cf. **36**, p. 595] in control soil and in soil inoculated with *Fusarium culmorum* was considerably improved by fernasan at all rates of seeding, a 1% dressing only sometimes being markedly better than the 0·5%. There was an increase in infection when the seed was sown thickly under conditions favouring the disease.

Bloom (J. R.) & Couch (H. B.). **Influence of pH, nutrition, and soil moisture on the development of large brown patch.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 260, 1958.

Post emergence inoculation of *Agrostis palustris* in nutrient culture with *Rhizoctonia* [*Corticium*] *solani* showed disease severity to increase with decrease in N, to be unaffected by P or K, but to be greater at low levels of balanced nutrition. Variation of pH was without effect with low N, but with high N disease intensity was least at pH 4 and 7.

Latch (G. C. M.) & Wenham (H. T.). **Fungal leaf-spot diseases of Cocksfoot (Dactylis glomerata L.) in the Manawatu. I. Leaf streak caused by Scolecotrichum graminis.**—*N.Z. J. agric. Res.*, 1, 2, pp. 182–188, 5 fig., 1958.

A detailed study from Massey Agricultural College, Palmerston North, of *S. graminis* [cf. **34**, p. 459], present on *D. glomerata* in the Manawatu area and also on *Phleum pratense*, showed that it causes the principal leaf spot disease of *D. glomerata* locally, and probably in most of New Zealand, but is of little economic importance. The disease is most prevalent from mid-autumn to late spring, diminishes in Nov., and then for 2 months occurs chiefly on sheltered plants.

SCHRAMM (L. C.) & BEAL (J. L.). **A study on Couch Grass ergot.**—*J. Amer. pharm. Ass.*, Sci. Ed., **47**, 5, pp. 326–329, 1 fig., 1958.

In an epiphytotic of *Claviceps purpurea* on *Agropyron repens* in Ohio, in 1956, the sclerotial dimensions were 10–12 × 1–2 mm. The ergotoxine content was above, and that of ergonovine below, National Formulary X limits. Wheat adjacent to the infected grass was also attacked.

ALESHINA (Mme O. A.). Цветочная плесень Клевера в Мурманской области. [Flower mildew on Clover in the Murmansk district.]—*Plant Prot., Moscow, 1957*, 3, p. 44, 1957.

In investigations in 1953–4 at the Academy of Sciences, U.S.S.R., on anther mould (*Botrytis anthophila*) [cf. **25**, p. 455; **36**, p. 513] of clover in the region of Zapolyare, var. Pechorsky was very susceptible (up to 55% infected plants); no variety was resistant. Clover seeds steeped in a 2-month culture filtrate of *Trichoderma lignorum* [*T. viride*] developed only 2% infection compared with 35% in the control and germination was normal; granosan and thiram were inefficient.

TOMS (J.). **Manganese deficiency of subterranean Clover in Western Australia.**—*J. Dep. Agric. W. Aust.*, Ser. 3, **7**, 2, pp. 215–216, 2 fig., 1958.

Subterranean clover has recently been extensively affected locally by Mn deficiency [cf. **34**, p. 726] with adverse effect on plant growth early in the growing season. In var. Dwalganup the symptoms resemble those of K deficiency; the older leaves turn yellow-brown, with small spots of dead tissue, mostly marginal, which enlarge so that the whole leaf dies. With mild deficiency leaves are yellow-green with deeper green veins. Seed production is much reduced but is generally sufficient for regeneration.

In var. Mt Barker the symptoms resemble those of Fe deficiency. When mild, the leaves are a pale yellow-green with interveinal chlorosis; when acute, interveinal tissues of older leaves die, followed by the death of the entire leaf. The plants are then often small and bright yellow and many die completely. The 40 lb./acre $MnSO_4$ dressing effectively applied may be reducible.

PANTUKHINA (Mme L. A.). К вопросу о выведении фитофтороустойчивых сортов. [On the question of introduction of *Phytophthora* resistant varieties.]—*Potato, Moscow, 1958*, 2, pp. 62–63, 1958.

This information from the Experiment Station for vegetables, fruit, and potatoes in White Russia gives the potato var. 9170 c/46, of high starch content, as one of the most resistant to *Phytophthora* [*infestans*: **36**, p. 550], but it is not recommended because of mediocre yield. Hybrid 18–10 c/50 (from K1711 × 9170 c/46), which gave a 3–5% greater yield and has 15–19% higher starch content than the average, is slightly susceptible only in Sept., losses being minimal.

MALENEV (F. E.). Влияние бора, меди, марганца и цинка на устойчивость Картофеля к фитофторе и другим болезням. [The influence of boron, copper, manganese, and zinc on the resistance of Potatoes to *Phytophthora* and other diseases.]—*Sborn. Microelem. Agric. Med. Riga, Acad. Sci. Latv. S.S.R., 1956*, pp. 429–436, 1956. [Abs. from *Referat. Zh. Biol., 1958*, 5, pp. 198–199, 1958.]

At Leningrad Agricultural Institute in 1950–53 potato tubers of the vars. Cobbler, Berlichinger, 398 hybrid, and Cobbler × Ubel were treated before sowing or the plants were sprayed at 7–10 day intervals from 25 June with 200 mg./l. sodium borate and the sulphates of Cu, Zn, and Mn. The same microelements at 100 mg./l. were also applied to the soil at planting. Cu conferred the greatest resistance to the tubers and haulm to *P. infestans* [**37**, p. 304], whereas B increased only that of the

tubers, and Mn only haulm resistance; Cu and B increased resistance to bacteriosis (*Bacterium* [*Pseudomonas*] *xanthochlora*, *B.* [*Corynebacterium*] *sepedonicum*, and *Bacillus phytophthorus* [*Erwinia phytophthora*]) better than Mn and Zn, and increased yield. Tuber treatment was the most effective but soil application also gave very good results.

GANDEL'MAN (T. C.). Агротехника в борьбе с Картофельным раком. [Agrotechnical measures against Potato wart.]—*Potato, Moscow, 1958*, 2, pp. 44–46, 1 fig., 1958.

In a joint study by the White Russia Academy of Science and the Minsk Experiment Station in the Cherven district, U.S.S.R., on wart disease [*Synchytrium endobioticum*: **37**, p. 304 and below] it was found that infested soil was almost or completely cleared by planting rye, lupins, cabbage, maize, flax, or resistant potato vars. for at least 3 years; cabbage gave 100% control of *S. endobioticum*.

FEDOTOVA (Mme T. I.) & KARASEVA (Mme E. F.). Роль иммунных сортов Картофеля в очищении почвы от возбудителя рака. [The role of immune Potatoes in soil disinfection from wart disease.]—*Plant Prot. Moscow, 1957*, 5, pp. 45–46, 1957.

At the Litovskiy Experiment Station for Potato Diseases and Pests, trials showed the [*Synchytrium endobioticum*: see above] resistant vars. Fram, Puntukas, and Imandra were useful for freeing the soil from infection. After the crop 1 g. soil contained 4–18 zoosporangia compared with 453 in soil planted with the susceptible var. Valley.

MIRZABEKYAN (R. O.) & SINITSUINA (Mme N. V.). Испытания актиномицетов против рака Картофеля. [Tests with actinomycetes against Potato wart.]—*Plant Prot., Moscow, 1957*, 5, pp. 42–44, 1957.

In further investigations at the Academy of Sciences, Moscow, on actinomycete strains antagonistic to [*Synchytrium endobioticum*: **36**, p. 55], strain No. 167 and to a lesser extent 711 were the most active. The author suggests that when compost with added actinomycetes is applied during planting the actinomycetes penetrate the tubers.

HENDRIX (F. F.) & NIELSEN (L. W.). **Invasion and infection of crops other than the forma suscept by Fusarium oxysporum f. batatas and other formae.**—*Phytopathology*, **48**, 4, pp. 224–228, 1958.

In greenhouse sand culture tests at N. Carolina State College, Raleigh, *F. oxysporum* f. [*F. bulbigenum* var.] *batatas* [cf. **36**, p. 552] invaded the roots and stems of tomato, cabbage, tobacco, soybean, snap bean [*Phaseolus vulgaris*], potato, watermelon, cowpea, maize, and cotton, inoculated by pouring a suspension of the fungus over injured roots, but induced disease symptoms only in sweet potato [cf. **28**, p. 189]. *F. oxysporum* was also isolated from the above crops (excepting potato) in naturally infested field soil, though again only sweet potato showed external symptoms. Of 402 isolates, 147 were pathogenic to sweet potato and considered to be *F. b.* var. *batatas*. There were differences in the pathogenicity to sweet potato among isolates of var. *batatas* from the different crops.

F. oxysporum f. [*F. b.* var.] *niveum*, *F. o.* f. *vasinfectum* [*F. vasinfectum*], *F. o.* f. *phaseoli*, *F.o.* f. [*F. b.* var.] *lycopersici*, *F. o.* f. *conglutinans* [*F. conglutinans*], and *F. o.* f. [var.] *nicotianae* invaded roots and stems of inoculated sweet potato, but only the last-named induced symptoms [cf. **22**, p. 456]. On reisolation from sweet potato, *F. b.* var. *lycopersici* was less pathogenic to tomato than before. It is indicated that these *Fusarium* vars. can persist in the soil by invasion of the roots of crops other than those to which they are pathogenic.

Wijewantha (R. T.). **Report on the sulphur-dusting of smallholdings in 1956/57.** —*Quart. Circ. Rubb. Res. Inst. Ceylon*, **33**, 3–4, pp. 63–77, 1 diag., 1 graph, 1 map, 1957.

Details are given of the organization of the sulphur-dusting of smallholdings in Ceylon against *Oidium* [*heveae*: cf. **36**, p. 423] in 1956–7 and of the results obtained.

Applications from 38 provisionally formed groups of smallholders were received. Dusting was begun on 20 Dec. when the green buds on the leafless twigs were just beginning to sprout on about 10% of the trees. Each holding normally received 5 dustings at weekly intervals with 12 lb. S dust/acre/application. Dusting was completed by 7 a.m. each day. In all, 3,119¾ acres on 704 holdings were dusted and benefited significantly; 604 were 100–95% free from infection, 3 had over 10% infection, and in 97% leaf fall due to *O. heveae* was under 5%.

Bolle-Jones (E. W.) & Mallikarjuneswara (V. R.). **Cobalt: effects on growth and composition of Hevea.**

Bolle-Jones (E. W.). **Molybdenum: effects on the growth and composition of Hevea. Zinc: effects on the growth and composition of Hevea.**—*J. Rubb. Res. Inst. Malaya*, **15**, 3, pp. 128–140, 2 fig.; pp. 141–158, 3 fig., 4 graphs; pp. 159–167, 5 fig., 3 graphs, 1957.

At the Rubber Research Institute of Malaya, Kuala Lumpur, *Hevea* rubber seedlings were grown in sand cultures. Seedlings without Co were shorter, less sturdy, weighed less, and the root mass was less dense. A supply of 0·005 p.p.m. Co brought the plants back to normal. Mo deficiency [**36**, p. 664] had the same effects plus a marginal or apical leaf scorch. Effects varied according to the levels of the other nutrients applied, particularly S and Ca. Zn deficiency [loc. cit.] also reduced size and caused leaflets in the tender stage to become claw- or hook-shaped; older ones were narrower than normal.

Hughes (C. G.). **The world distribution of Cane diseases.**—*Cane Gr. quart. Bull.*, **21**, 2, pp. 69–72, 1957; **21**, 4, pp. 141–144, 2 fig., 1958.

This list of sugarcane diseases [cf. **36**, p. 275] is arranged in 2 tables, the 1st including all those which have been recorded in Australia (though not necessarily still present), the 2nd 4 diseases not known there but serious or potentially so elsewhere.

Antoine (R.). **Cane diseases.**—*Rep. Sug. Ind. Res. Inst. Mauritius, 1957*, pp. 53–65, 6 fig., 5 graphs, [? 1958].

Trials to investigate the occurrence of sugarcane chlorotic streak virus [**36**, p. 616] showed that symptomless canes in dry areas are free from the virus; cuttings from them reacted in the same way as heat-treated material when planted in dry and humid areas. The loss of symptoms from originally infected stools in dry areas indicates the actual loss of the virus. The disease caused a reduction in yield (compared with heat-treated cuttings) in the var. Ebene 1/37 of 73% in the super-humid zone and 41% in the sub-humid. Infection is contracted in virgin cane and first ratoons, particularly during the summer. Some indications have been obtained that the disease is soil-borne.

The effects of sugarcane ratoon stunting [virus] are influenced by the growing conditions; thus, in one trial it caused a loss in yield of 65% under conditions of severe drought and 39% in an area where soil moisture was excessive.

In trials of hot water treatment against chlorotic streak the temp. at the centre of a cutting 4·8 cm. diam. was only 42° C. after 20 min. at 52°, the standard treatment. The virus was inactivated in thin nodal cylinders at above 44°. When the vars. M. 134/32 and Ebene 1/37, with low fibre content and B. 337 (high) were

subjected to 50° for 2 hr., the treatment against ratoon stunting, its efficacy (time to reach 50° inside the cutting) was not affected by the fibre content.

Six organo-mercurials and a tin organic fungicide (brestan [**37**, p. 61]) were all effective against *Ceratostomella* [*Ceratocystis*] *paradoxa*. Previous conclusions that aretan should not be used at less than 1% were confirmed.

Report on experimental work—Philippine Sugar Canes.—*Sug. J. N. Orleans*, **20**, 10, pp. 25, 28–33, 1 diag., 1958.

The following information of phytopathological interest is presented in this report from the Victorias Milling Company Experiment Station, Philippines. Indications of susceptibility to ratoon stunting virus in var. N.Co. 310 [**37**, p. 181], which saved the Formosa sugar industry in the epiphytotic of leaf scorch [*Stagonospora sacchari*: **36**, p. 425], have been observed, leaving CP29/116, H39–3633, and Q 50 to replace the widely grown H37–1933, the yield of which is declining owing to extensive and severe infection by *S. sacchari*.

A local leaf-splitting disease resembling but less virulent than the Australian downy mildew [*Sclerospora sacchari*] was the only one encountered in a ratoon field of Co. 449, and it has not reappeared since the affected canes were rogued out. However, the same variety contracted leaf scorch when planted adjacent to heavily infected H37–1933.

Although partial control of leaf scorch has been effected by dipping the seed pieces in fungicides the substitution of resistant varieties for H37–1933 is regarded as the most practical method of combating the disease under existing conditions.

Joly (S.) & Gambogi (P.). **Brevi notizie e qualche ricerca sulla biologia di Colletotrichum falcatum Went. agente del marciume rosso della Canna da Zucchero.** [Brief notes and some investigations on the biology of *Colletotrichum falcatum* Went., the cause of red rot of Sugarcane.]—Repr. from *Ann. Fac. Agr. Pisa*, N.S., **18**, 22 pp., 3 fig., 5 graphs, 1957. [149 refs.]

After a preliminary account of the geographical distribution, taxonomy, life-cycle, pathogenicity, resistant varieties, and control of red rot of sugarcane (*Physalospora* [*Glomerella*] *tucumanensis*), the authors report investigations at the University of Pisa, Italy, into the cultural characters. The fungus grew best on Richards's agar, utilized maltose and saccharose best of the sugars, and DL-serine, D-amino valerianic acid, and sodium glutamate of the N sources. The opt. pH was 4·5, growth finally changing this to 6; the opt. temp. 30° C. *In vitro* the fungus was strongly inhibited by 8 *Penicillium* spp. and 11 *Actinomyces* spp. isolated from soil. Captan completely inhibited mycelial growth on agar at 0·008% and dithane and karathane did so at 0·016%.

Yen (W. Y.) & Wang (C. S.). **A new covered smut of Sugarcane in Taiwan.**—*J. agric. Ass. China*, N.S. **9**, pp. 1–7, 3 fig., 1955. [Chinese. Abs. from English summary. Received Feb. 1958.]

The only smut of sugarcane hitherto recorded in Formosa, *Ustilago scitaminea*, has not been collected in the field for 20 years [map 79]. In Jan. 1953 a new smut, *Sphacelotheca macrospora* Yen & Wang, was found on N:Co 310 at the Huwei Sugarcane Improvement Station. Affected plants were normal in appearance except for the ovary which was entirely replaced by spores. All the panicles from any one cane were affected at the same time. The spherical to subspherical, chestnut brown spores measured $11{\cdot}5–17 \times 9{\cdot}8–15{\cdot}7\,\mu$.

Egan (B. T.). **Leaf-scald resistance trial in North Queensland.**—*Cane Gr. quart. Bull.*, **21**, 4, pp. 129–130, 1 fig., 1958.

North of Townsville leaf scald [*Xanthomonas albilineans*: **37**, p. 308] causes more

insidious than spectacular losses on sugarcane, though occasionally serious damage is caused to H.Q. 426 and Q. 44; Badila frequently has dead stalks, and Trojan may carry the bacteria for long periods without obvious symptoms. Q. 50 and Pindar are resistant but quite a number of new commercial canes are susceptible.

EGAN (B. T.). **Bacterial mottle in North Queensland.** *Cane Gr. quart. Bull.*, **21**, 4, p. 124, 1958.

In 1957 bacterial mottle [**37**, p. 182] on sugarcane was found in the Mossman and Hambledon areas on Q. 57 and Q. 66, approximately 20% of the stools being infected in each. Yield losses are not severe as generally only a portion of the stools are diseased, but stool deaths in the following ratoon crop can be serious. Elephant grass (*Pennisetum purpureum*), Para grass (*Brachiaria mutica*), and Guinea grass (*Panicum maximum*) are alternative hosts.

TERNOVSKY (M. F.). Использование диких видов Табака в селекции на устойчивость к болезням. [The use of wild Tobacco varieties in the selection for resistance to diseases.]—Вест. Сельск. Науки [*J. agric. Sci., Moscow*], **3**, 1, pp. 137–139, 1958. [English and German summaries.]

At the Krasnodar Tobacco Research Institute, U.S.S.R., investigations have been proceeding for some years on the resistance of *Nicotiana* spp. to tobacco mosaic virus [**34**, p. 617], powdery mildew [*Erysiphe cichoracearum*], and other diseases. No tobacco variety is resistant to them but resistant hybrids were obtained in crosses of Dubec 44 with *N. glutinosa*, *N. silvestris*, and *N. tomentosiformis* and by repeated crosses of the hybrids with Dubec 44. Dubec 566, Dubec 7, Samsun 47/10, Alma-Atinsky 315, Trapezoid 161, Trapezoid Talassky, and Ostrolist Immuny possess complex resistance to parasitic fungi and mosaic. Attempts to make use of the immunity of *N. alata* and *N. sandere* failed as their hybrids were sterile. Productive hybrids were obtained by crossing *N. glauca* with tobacco and *N. rustica*.

HIRTH (L.), BASSET (J.), & CROISSANT (O.). **Structure et propriétés des particules élémentaires du virus de la mosaïque du Tabac. I. Résultats preliminaires obtenus au moyen des hautes pressions.** [Structure and properties of the elementary particles of the Tobacco mosaic virus. I. Preliminary results obtained by means of high pressures.]—*Ann. Inst. Pasteur*, **93**, 3, pp. 309–322, 2 pl., 8 graphs, 1957. [English summary.]

Aggregated and non-aggregated suspensions of purified tobacco mosaic virus were subjected for 30 min. to pressures of 1–14,000 kg./sq. cm. The lowest pressures induced a marked enhancement of virulence in the aggregated preparations gauged by the number of local lesions on *N[icotiana] glutinosa* and *Datura stramonium* leaves, whereas the virulence of the non-aggregated declined under the same treatment. Electron microscopy further revealed differences in the fragmentation pattern of the 2 types of virus, while the existence of sub-units of some 60 Å was demonstrated by a study of the split particles. Suspensions that had been subjected to high pressure were still able to combine with the antibody even after the total disappearance of virulence.

SUHOV (K. S.) & KAPITSA (O. S.). Морфология незавершивших развития „неинфекционных" частиц вируса Табачной мозаики. [The morphology of the 'non-infectious' particles of Tobacco mosaic virus at the stage of incomplete development.]—Докл. Акад. Наук СССР [*C. R. Acad. Sci. U.S.S.R.*], **113**, 6, pp. 1366–1368, 1 pl., 1957.

In leaves of *Nicotiana glutinosa* inoculated with tobacco mosaic virus at the Institute of Genetics, U.S.S.R. Academy of Sciences [**36**, p. 170; **37**, p. 508], a latent phase was detected in the lower epidermis only 10 hr. after inoculation at 28° C.,

the opt. for the virus. Under the electron microscope small fibrillar formations were noticed, 2–2·5 times thinner than the infectious virus particles. When the inoculated leaves were submitted to a much lower temp. (down to 5°), after 1 hr. the non-infectious formations became highly infectious and the fibrillar particles disappeared.

KASSANIS (B.), TINSLEY (T. W.), & QUAK (FREDERIKA). **The inoculation of Tobacco callus tissue with Tobacco mosaic virus.**—*Ann. appl. Biol.*, **46**, 1, pp. 11–19, 1 pl., 1958.

At Rothamsted Experimental Station, although cultures of normal and conditioned tobacco callus tissue [cf. **37**, p. 184] occasionally became infected when dilute solutions of tobacco mosaic virus were poured over them, prior injury was usually necessary, the number of infections depending on the kind and number of injuries. Tissues infected through superficial injuries were usually virus-free after sub-culturing, whereas those infected by needle-prick remained infected.

Success in infection of tomato root tips (2 cm. long) [cf. **14**, p. 127] was achieved by rubbing the whole length with inoculum and celite. Virus appears to multiply in inoculated cells but to be restricted in movement, so that permanent infection calls for infection of the meristematic tissue itself.

Movement of the virus between the cells was at a rate of about 1 mm./week, or the speed at which it moves through the cells of leaf parenchyma [cf. **14**, p. 198]. No plasmodesmata were observed between cells in the tissue cultures [cf. **16**, p. 67].

SCHRAMM (G.) & ENGLER (R.). **The latent period after infection with Tobacco mosaic virus and virus nucleic acid.**—*Nature, Lond.*, **181**, 4613, pp. 916–917, 1 graph, 1958.

The authors consider that bioassay is best for the detection of small quantities of virus. The local lesion test with *Nicotiana glutinosa* sufficed to detect tobacco mosaic virus at dilutions of 10^{-12}–10^{-13} g./ml., while with Samsun tobacco this virus produced 50% infection at a dilution of 10^{-16} g./ml.

Bioassay and other methods were used at the Max-Planck-Institut für Virusforschung, Tübingen, Germany, to follow the infection process in young Samsun tobacco plants. Three leaves of each plant were inoculated with a 10^{-6} g./ml. solution in 0·1 M phosphate buffer at pH 7·2, and then rinsed first with water and then with dilute specific antiserum. Homogenates were tested at intervals on *N. glutinosa*. There was a latent period of about 30 hr., followed by rapid multiplication, slowing down when a tissue conc. of about 10^{-7} g./ml. was attained. The appearance of the first complete particles corresponded to a conc. of 7×10^{-17} g. virus/g. leaf. Even with a very sensitive test in tobacco no infective particle was detected before 30 hr. and this was taken to represent a true latent period. As the ribonucleic acid (RNA) fraction of tobacco mosaic virus is infectious [**35**, p. 551] it seemed probable that, in the plant cell, the external virus protein shell must be removed before multiplication can start. On this assumption the latent period might be expected to be shorter in plants inoculated with isolated RNA. With solutions of the latter of the same infectivity as the whole virus the latent period was found to be 10–12 hr. shorter. This was taken as evidence that the release of the RNA from the virus protein takes several hours. It is not clear, however, why the RNA itself has such a long latent period.

GORDON (H. P.) & STAEHELIN (M.). **The incorporation of 5-fluorouracil into the nucleic acid of Tobacco mosaic virus.**—*J. Amer. chem. Soc.*, **80**, 9, pp. 2340–2341, 1958.

Further experiments at the Virus Laboratories, University of California, Berkeley, demonstrated that in tobacco mosaic virus floated on a 0·1% solution of 5-fluorour-

acil, about $\frac{1}{3}$ of the native uracil is replaced by 5-fluorouracil and the total virus yield is reduced by roughly half as compared with a water control. However, when applied to an [unspecified] local-lesion host, the same number of lesions was produced by the substituted as by the normal virus. Isolated nucleic acid prepared by a detergent treatment (*Biochim. biophys. Acta*, **25**, p. 87, 1957) likewise proved to be infective.

POUND (G. S.) & WELKIE (G. W.). **Iron nutrition of Nicotiana tabacum L. in relation to multiplication of Tobacco mosaic virus.**—*Virology*, **5**, 2, pp. 371–381, 1 fig., 1958.

In further experiments at the Dept of Plant Pathology, University of Wisconsin, the growth of tobacco plants infected by tobacco mosaic virus [**36**, p. 135] decreased at all levels of Fe and mosaic symptoms were reduced in intensity. Virus infection reduced the Fe deficiency chlorosis of apical leaves, a reduction believed to be due to translocation of chloroplast components from the basal leaves, released as a result of chloroplast disintegration by virus infection. The concentration of virus in leaf samples or disks was not influenced under moderate Fe deficiency but only when it was extreme.

KÖHLER (E.). **Über die Ausbreitung von Mosaikviren in der Tabakpflanze. II. Weitere Versuche mit dem X-Virus an Blättern.** [On the diffusion of mosaic viruses in the Tobacco plant. II. Further experiments with the X-virus on leaves.]—*Zbl. Bakt.*, Abt. 2, **111**, 6–7, pp. 191–196, 1 fig., 1958.

Continuing his experiments at the Institut für Virusserologie, Brunswick, Germany [**35**, p. 725], the author found that the movement of potato virus X in a Samsun tobacco leaf proceeds with maximum rapidity along the vein downwards (0·042–0·083 mm./hr.), considerably more slowly along the vein upwards (0·031–0·042), and slowest in the interveinal area (0·031) [cf. **14**, p. 198]. Changes in the concepts previously held regarding the mechanism of virus diffusion in the leaf parenchyma are discussed in the light of these studies.

HIDAKA (Z.) & NAKAZAWA (K.). **Studies on the transmission of Cucumber mosaic virus to Tobacco. I. Relation between infection and flight of alate Myzus persicae Sulz. at various times of cutting down the fore crop barley.**—*Jubilee Publ. in Commemoration of the 60th birthdays of Prof. Yoshihiko Tochinai and Prof. Teikichi Fukushi*, pp. 259–267, 1 fig., 1 diag., 14 graphs, 1955. [Japanese. Abs. from English summary. Received 1958.]

In field experiments [at the Hatano Tobacco Experiment Station, Kanagawa-ken] the amount of cucumber mosaic virus infection in tobacco plants increased the earlier the preceding barley crop was cut, owing to an increase in the numbers of winged *M. persicae*.

WHEELER (B. E. J.). **Investigations on Alternaria leaf-spot of flue-cured Tobacco in Nyasaland.**—*Misc. Publ. Commonw. Mycol. Inst.* 15, 32 pp., 2 diag., 3 graphs, 1958. 5*s*.

A survey during 1954–56 in the Kasungu district of Nyasaland showed *A. longipes* [**34**, p. 617] to be more prevalent on tobacco planted on 2nd-yr. land, on heavy soils, and on plantings receiving high N and low P and K. The pathogen survives the dry season chiefly on tobacco debris; it was unable to survive in dry soil for more than a month, and alternative hosts were not in evidence. Spore production was favoured by high humidity and dispersal by dry, sunny conditions. Experimental inoculation of 6-week-old tobacco seedlings did not produce typical symptoms, but seedling infection is of little importance in nurseries. Leaf spot was not usually detected until 2–3 weeks before the beginning of harvest; after that spread was

frequently very rapid. The use of fungicidal dusts or sprays is considered to be impractical owing to rainfall: the best means of control lie in attention to field sanitation, choice of site, and use of balanced fertilizers.

MORGAN (O. D.). **Black leg of Tobacco in Maryland.**—*Plant Dis. Reptr*, **42**, 3, pp. 318–319, 2 fig., 1958.

In S. Maryland, as a result of over irrigation of tobacco beds, especially where the plants were closely packed, 'black leg' or 'bed rot' caused by *Erwinia aroideae* [cf. **35**, p. 641] occurred. A soft rot of the leaves was followed by a black stalk rot on young plants; on older plants black streaks developed on the stalks or the stalks turned black near the ground. In some plants the roots were infected.

NAGAICH (B. B.). **Characterization of a 'Tobacco-mosaic type' virus obtained from Tomato.**—*Diss. Abstr.*, **17**, 11, pp. 2395–2396, 1958.

This virus was found to be serologically related to tobacco mosaic virus; both immunize tobacco and tomato plants against each other. The tomato virus is not related to either tobacco ring spot or cucumber mosaic viruses. It produced necrotic local lesions on scarlet runner bean [*Phaseolus coccineus*] and Black Eye cowpea No. 5, both immune from tobacco mosaic virus, and did not produce local lesions on bean vars. susceptible to tobacco mosaic. The thermal inactivation point was 72° C. compared to 82°–84° for tobacco mosaic, and it was completely inactivated after 54 hr. at 61°. Thermal inactivation was more rapid in alkaline than acid conditions.

GIGANTE (R.). **L'arricciamento delle foglie basali del Pomodoro.** [Curling of the basal leaves of Tomato.]—*Boll. Staz. Pat. veg., Roma*, Ser. 3, **15** (*1957*), 1, pp. 17–30, 11 fig., 1958. [English summary.]

In April 1957 glasshouse tomatoes growing near Tortoreto, Pescara, Italy, developed symptoms not hitherto recorded in Italy. The leaves were irregular and very brittle, the leaflets curled downwards with raised areas on the upper surface and corresponding concavities underneath. A marked thickening of parts of the midrib and the lateral veins was perceptible on the under surface. Upper leaves remained normal.

The virus was transmitted to healthy tomato plants by sap inoculations. On tobacco leaves it produced occasional, small, local lesions and a constant systemic mosaic and on *Nicotiana glutinosa* and *Datura stramonium* necrotic local lesions.

The virus, considered to be a strain of tobacco mosaic [cf. **37**, p. 377], was infective at 1 in 1,000,000, with a thermo-inactivation point of 90–95° C.

HOLMES (F. O.). **A single-gene resistance test for viral relationship as applied to strains of spotted-wilt virus.**—*Virology*, **5**, 2, pp. 382–390, 1958. [32 refs.]

In this lecture to the National Academy of Sciences, at the Rockefeller Institute for Medical Research, New York, in Nov. 1957, the author summarized and discussed the evidence provided by genetical studies on the resistance of tomato to tomato spotted wilt virus that similar strains of the virus are found in the Northern and Southern Hemispheres [cf. **35**, p. 148]. He concludes that genes for resistance may serve to identify other viruses.

LEBLOND (D.). **Application de fongicides sur les Tomates.** [The application of fungicides to Tomatoes.]—*Rep. Québec Soc. Prot. Pl.*, **39**, *1957*, pp. 52–54, 1958.

A brief account is given of the results of spraying tests conducted at Ste-Foy, Quebec, in 1955 and 1956 on John Baer and Quebec 59 tomatoes with Bordeaux mixture, COCS, captan 50% M, fermate, manzate, phygon XL, and thioneb 25% M

against *Phytophthora infestans*. Other diseases present were *Phoma destructiva* and *Botrytis cinerea*. All the materials gave satisfactory control of *P. infestans*, while captan to some extent prevented attack by the other diseases.

WIGGELL (D.). **Tomato leaf mould: spraying trials in Lancashire and Yorkshire, 1953–56.**—*Plant Path.*, 7, 1, pp. 26–29, 1958.

In further spraying trials against tomato leaf mould (*Cladosporium fulvum*) [cf. **33**, p. 767] captan, zineb, thiram, and manam all gave some control of mild infection, but left a deposit on the fruit. Liquids containing salicylanilide + wetter and colloidal copper + wetter both proved to be safe, but gave poor control of severe attacks. Nabam + $ZnSO_4$, used at a high volume, gave consistently good results against severe attacks and caused no damage except that some leaf scorching occurred when spraying was done in bright sunshine. The $ZnSO_4$ used contained only 22·7% Zn, as against 36% recommended in America. Where Mn sulphate was used with nabam, control was still of a high order, but the foliage was severely scorched. In one test of low volume spraying with nabam + $ZnSO_4$ the results were similar to the high volume, but infection was light.

DE LEON (R. G.). **Test of fungicides for the control of Tomato leaf mold.**—*Philipp. Agric.*, **41**, 5, pp. 268–272, 1957.

In tests at the University of the Philippines for control of tomato leaf mould (*Cladosporium fulvum*) [see above] zerlate and dithane Z-78 at 2 lb./100 gal. were the most effective in the field and greenhouse, reducing disease from 75·83 to 20·2 and 21·3% and from 62 to 11·5 and 22·4%, respectively. Orthocide 50 wettable and manzate at 2 lb./100 gal. and the antibiotics phytomycin (8 ml./gal.) and terraclor (40 g./gal.) were less effective. In general, sprayed plants outyielded the controls, but terraclor, manzate, and phytomycin were slightly phytotoxic.

STALL (R. E.). **Cytological, cultural, and pathological studies of Alternaria solani (Ell. and Mart.) Jones and Grant in relation to heterocaryotic variation.**—*Diss. Abstr.*, **17**, 11, p. 2398, 1957.

In studies at Ohio State University the numbers of nuclei in vegetative cells of a sporulating strain of *A. solani* from tomato were found to range from 1–9. The best stain was Delafields' hematoxylin after bleaching the black cell walls with 2% H_2O_2 + a trace of NaOH. Cells of conidial primordia contained 1–3 nuclei. Pores were observed between the cells of the conidia and of the mycelium.

From X-irradiated conidia 9 mutants were obtained, 7 of which reverted to the wild type. Evidence of the existence of genetically dissimilar nuclei in the same cell was obtained.

Strains differing in pathogenicity could not be separated from any of the wild types, but 8 wild isolates differed in virulence on 6 hosts, including domestic and wild *Lycopersicon* spp. From these tests 5 pathogenic races of *A. solani* were differentiated [cf. **33**, p. 554].

RUZANOV (P. G.). Коричневая пятнистость Помидоров и меры борьбы с ней. [Brown spot of Tomatoes and measures for its control.]—Тр. Молд. овощекартоф. оросит. опытн. ст. Кишинев [*Trud. Moldav. Veg. Irrig. Exp. Sta. Kishinev*], *1956*, pp. 321–326, 1956. [Abs. from *Referat. Zh. Biol.*, *1958*, 5, p. 199, 1958.]

Recommendations for the control of tomato brown spot (*Alternaria solani*) [**37**, p. 250] in Moldavia are: spraying with 1% Bordeaux mixture before planting out, transplanting 45–60 days after sowing, spraying after hail and heavy rain, and seed selection from healthy plants. Good results were obtained by the direct cultivation method [direct sowing].

Forest Pathology.—*Rep. For. Inst. Oxf.*, **33** (*1956–1957*), pp. 13–17, 1958.

In this report [cf. **36**, p. 505] are given the results of further examination of Sitka spruce [*Picea sitchensis*] and other conifers in Kerry Forest, N. Wales, affected by bark necrosis [cf. **35**, p. 129]. An association was found between this and soil factors on sites liable to water shortage that may induce local restriction of supplies to the roots, followed in turn by fluting of the lower main stem. Beech is similarly affected.

Nectria coccinea [cf. **34**, p. 494] was isolated from small cankers on beech in Merionethshire and from girdled twigs of rowan [*Sorbus aucuparia*] and white beam [*S. aria*]. From the stem of an uninjured Japanese larch with discoloration of the heartwood, a *Peniophora*, probably *P. velutina*, was isolated. A specimen of *Metasequoia glyptostroboides* which died at Oxford was infected by *Armillaria mellea*. *Phomopsis pseudotsugae* [cf. **36**, p. 625] was found on a Japanese larch affected by drought.

Annual Report of the Forest Insect and Disease Survey, Canada Department of Agriculture, 1957.—94 pp., 11 maps, 1958.

In the section of this report [cf. **37**, p. 115] dealing with forest diseases in the Atlantic Provinces A. G. Davidson and W. R. Newell (pp. 24–25) note the discovery of an elm infected by *Ceratocystis ulmi* in New Brunswick. *Dothichiza populea* was observed, for the first time in recent years, on Lombardy poplars recently imported into New Brunswick. Noteworthy new records included *Pezicula carnea* and the *Sphaeronema* state of *Dermea acerina* on red maple [*Acer rubrum*], and *Melampsora paradoxa* and *Valsa salicina* on willow [*Salix*].

From Quebec R. Pomerleau (pp. 29–31) reports that there is a high incidence of *Stereum pini* in young jack pine [*Pinus banksiana*]. The fungi responsible for the heaviest losses in balsam fir [*Abies balsamea*] are *S. sanguinolentum* [**37**, p. 380] and *Corticium galactinum* and in black spruce [*Picea mariana*] *Polyporus circinatus* and *Fomes pini*.

J. Reid (pp. 49–51) reports *Septobasidium pinicola* parasitizing scale insects on white pine [*Pinus strobus*] in Ontario. Other new records were *Rhizosphaera pini* on *A. balsamea*, *Melanconium oblongum* on butternut [*Juglans cinerea*], and *Coryneum kunzei* on white oak [*Quercus alba*].

From Alberta A. A. Loman (pp. 70–71) reported outbreaks of *Hypodermella montivaga* on lodgepole pine [*P. contorta* var. *latifolia*].

The results of a survey in British Columbia of the fungi associated with post-felling deterioration of Douglas fir [*Pseudotsuga menziesii*: **37**, p. 322] and yellow pine [*Pinus ponderosa*] are presented by A. C. Molnar (pp. 82–87). The most common sap rot organism on yellow pine was *Peniophora gigantea* [cf. **36**, p. 798], but it was infrequent on Douglas fir, while *Stereum chailletii* [cf. **34**, p. 414] was common on the latter but did not occur on pine. European larch on Vancouver Island was slightly damaged by *Tympanis laricis* [**32**, p. 280], while the related *T. confusa* caused severe cankers on red pine [*Pinus resinosa*]. Among interesting new records were *Rosellinia lignaria* and *Valsaria moroides* on alder, *Linospora tetraspora* and *Poria pannocinta* on black cottonwood [*Populus trichocarpa*], *Retinocyclus abietis* on alpine fir [*A. lasiocarpa*], *Melanconiopsis inquinans* on broadleaf maple [*Acer macrophyllum*], and *Sphaerulina taxicola* on western yew [*Taxus brevifolia*].

Davidson (R. W.) & Hinds (T. E.). **Unusual fungi associated with decay in some forest trees in Colorado.**—*Phytopathology*, **48**, 4, pp. 216–218, 2 fig., 1958.

Studies at the Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado, of fungi fruiting on decaying trees at 9,000–11,500 ft. showed that *Helicobasidium corticioides* (*Mycologia*, **47**, pp. 918–919, 1955) was commonly

present on dead wood and associated with a brown pocket rot below basal wounds in *Abies lasiocarpa*. *Corticium radiosum* was isolated from a white butt rot of living trees of the same species. *Cryptochaete polygonia* was associated with a main stem decay of aspen (*Populus tremuloides*), and *Peniophora luna* with a trunk rot of lodgepole pine (*Pinus contorta* [var. *latifolia*]).

Klyushnik (P. I.). О повышении устойчивости древесных насаждений степной зоны к грибным болезням. [Means of increasing the resistance to fungal diseases in tree plantations in the steppe zone.]—Бюлл. Моск. Общ. Исп. Природы, Отд. Биол. [*Bull. Soc. Nat. Moscow*, Ser. Biol.], **63**, 1, pp. 65–69, 1958. [English summary.]

The author stresses the importance of the right choice of trees and shrubs for planting in the forested steppes of U.S.S.R. As yellow acacia (*Caragana arborescens*) is susceptible to *Septoria caraganae* and ash to *Endoxylina astroidea* and other diseases they should be planted in the dry zone in minimal numbers. In the last few years *Stereum hirsutum* has been very widespread on oak stumps.

Peace (T. R.). **A single case of fume damage.**—*Quart. J. For.*, **52**, 1, pp. 41–45, 1958.

A description is given of fluorine injury from brickworks fumes to trees at Woburn, Beds., on 26 June 1953. Damage was more severe on conifers than broadleaved trees [cf. **36**, p. 337; **37**, p. 142].

Fowler (M. E.) & Berry (F. H.). **Blossom-end rot of Chinese Chestnuts.**—*Plant Dis. Reptr*, **42**, 1, pp. 91–96, 4 fig., 1958.

At the U.S. Plant Introduction Garden near Savannah, Georgia, a number of *Castanea mollissima* trees grown from seed obtained from China in 1924 were attacked by *Glomerella cingulata* as soon as they began to bear nuts. Small brown spots on the green burrs spread and the nuts begin to decay at the blossom end, turning black and often being covered with pale greyish mould. The same fungus was found in several other chestnut orchards in Georgia and Maryland, and isolates from chestnut were shown by cross-inoculation to be identical with those attacking *Magnolia grandiflora* and causing bitter rot of apples. Fungicides had little or no effect on the incidence of nut decay, but as individual trees vary considerably in susceptibility thinning the orchard seems to offer the best means of control.

Pady (S. M.). **Dutch Elm disease in Kansas.**—*Plant Dis. Reptr*, **42**, 3, p. 402, 1958.

Dutch elm disease (*Ceratocystis ulmi*) [map 36] is recorded from Kansas State College, Manhattan; a new record for the State.

Beckman (C. H.). **Growth inhibition as a mechanism in Dutch Elm disease therapy.**—*Phytopathology*, **48**, 3, pp. 172–176, 6 graphs, 1958. [25 refs.]

In a study at the University of Rhode Island, Kingston, of the metabolic response of elm to *Ceratostomella* [*Ceratocystis*] *ulmi* [**36**, p. 362] as influenced by growth promoting or inhibiting factors, sodium 4,5-dimethyl-2-thiazolylmercaptoacetate (4,5-MTMA) was used, the solid chemical being inserted in 2 pairs of horizontal, tangential, $\frac{1}{4}$ in. borings in the outer sapwood, 6 in. apart on opposite sides of the stem of nursery trees 2–4 in. d.b.h. at approx 2 g./in. diam. A 30% inhibition of leaf expansion and 70% of sapwood development was observed 33 days after 1 application, and 3 weekly applications resulted in 65 and 77% inhibition, respectively. Trees were inoculated with *C. ulmi* 34 days after the initial treatment; 20 days later symptom incidence was 0, 20, and 100% in trees receiving 3, 1, and 0 applications. Re-inoculation at the 54th day resulted in 100% infection.

Correlation was observed between inhibition of sapwood development and of symptoms, but not between these and foliar inhibition.

The fact that elms are most susceptible to infection during spring growth indicates a relation of host-pathogen interactions to the physico-chemical condition of the host and the possible effects upon this of various therapeutic agents are considered in the light of other workers' observations.

MAY (C.), PALMER (J. G.), & HACSKAYLO (E.). **In vitro inhibition of Ceratocystis ulmi by acetone extracts from leaves or stem of some species of higher plants. Inhibition of growth of Ceratocystis ulmi in vitro by residues from extracts of soils and of plants growing in soils treated with captan or orthocide 50W.**—*Plant Dis. Reptr*, **42**, 3, pp. 399–401, 1 fig.; **42**, 5, pp. 696–702, 3 fig., 1958.

At Beltsville, Maryland, acetone extracts were made of the leaves or the stem (1 instance) of 31 vars. and spp. of shade trees and other plants, 21 of which inhibited growth of *C. ulmi*, whereas the other 10 (including extracts from *Ulmus americana*, *U. pumila*, *U. carpinifolia*) did not. In some a stimulatory fraction was also present, but there was no apparent relation between the 2 fractions.

Extracts from plants growing in soil treated with captan at 1 or 10 lb./25 sq. ft. were more inhibitory to *C. ulmi* on agar plates than those from plants receiving 0·1 lb. or untreated. There are indications that captan or a closely allied chemical was present in the extracts, though the inhibitor was not identified. Inhibitory residues were obtained from humus-containing soils in the greenhouse and in the field several months after application of captan.

JONES (T. W.). **Mortality in wilt infected Oaks.**—*Plant Dis. Reptr*, **42**, 4, pp. 552–553, 1958.

A survey in 1957 of oak trees infected by *Ceratocystis fagacearum* [see below] during the past 5 years showed that the death rate in the white oak group (*Quercus alba* and *Q. stellata*) was relatively low (19% of 97 trees) compared with that among the 365 red oaks (*Q. velutina*, *Q. coccinea*, *Q. marilandica*, and *Q. rubra*), only 3 of which remained alive.

YOUNT (W. L.). **Results of root inoculations with the Oak wilt fungus in Pennsylvania.**—*Plant Dis. Reptr*, **42**, 4, pp. 548–551, 1958.

At Harrisburg, Pennsylvania, red oaks inoculated in the roots with *Ceratocystis fagacearum* [cf. **35**, p. 54 and above] in 1954–57 took longer to develop foliage symptoms than trunk-inoculated trees. The incubation period ranged from 45 days to over a year and was not related to the inoculation distance from the trunk.

HIMELICK (E. B.) & CURL (E. A.). **Transmission of Ceratocystis fagacearum by insects and mites.**

BUCHANAN (W. B.). **The small Oak bark-beetle transmits the Oak wilt disease under caged conditions.**—*Plant Dis. Reptr*, **42**, 4, pp. 538–545, 1 fig.; pp. 546–547, 1958.

In the Sinnissippi Forest, Illinois, 369 insects were caught in baited traps over wounds on 92 of 235 oak trees near sources of wilt (*C. fagacearum*); 3 trees, on all of which spp. of Nitidulidae were trapped, became infected. In the greenhouse *Chrysobothris femorata*, often associated with wilted oaks, transmitted the fungus through feeding wounds to 13 of 54 oak seedlings after 30 min. on 2-week-old cultures. Infested *Garmania bulbicola* transmitted through mechanically made wounds on 11 of 32 seedlings.

The 2nd paper reports transmission by *Pseudopityophthorus minutissimus* to a small proportion of seedlings in nursery at New Franklin, Missouri.

Krstić (M.). **Dothichiza-rak ozbiljno ugrožava Topole.** [*Dothichiza*-canker, serious danger on Poplar.]—*Šumarstvo*, **9**, 6–7, pp. 346–352, 1956. [English and French summaries. Abs. from *Referat. Zh. Biol.*, *1958*, 5, p. 196, 1958.]

In young poplar plantations in Serbia, Yugoslavia, in 1955–6 after a very severe winter, *D. populea* [**37**, p. 424] caused extensive damage. The destruction of diseased trees and spraying with 1% Bordeaux mixture are recommended.

Milatović (Ivanka) & Sabadoš (Ana). **Cytospora-rak Topole.** [*Cytospora*-canker on Poplar.]—*Šumarski List*, **80**, 3–4, pp. 120–124, 1956. [English summary. Abs. from *Referat. Zh. Biol.*, *1958*, 5, p. 196, 1958.]

A survey by Zagreb University of *Cytospora chrysosperma* [*Valsa sordida*], causing severe damage on poplar trees in Postoyna, Slovenia, Yugoslavia, with detailed description of symptoms, host, and fungus.

Ridé (M.). **Sur l'étiologie du chancre suintant du Peuplier.** [On the etiology of the sweating canker of Poplar.]—*C. R. Acad. Sci.*, *Paris*, **246**, 19, pp. 2795–2798, 1958.

Aplanobacterium populi Ridé sp.nov. is the name applied to the bacterium responsible for sweating canker of poplars [**36**, p. 674], chiefly var. 'regenerata' of *Populus* × *euramericana*, in N. and N.E. France [**26**, p. 221], which has lately been attributed, on what are regarded as insufficient grounds, to *Pseudomonas syringae* f.sp. *populea*. At the Station centrale de Pathologie végétale, I.N.R.A., Versailles, inoculations of wounded branches with pure cultures of the pathogen between Apr. and the end of July caused typical lesions during the same year, whereas those performed from the end of Aug. to Dec. produced no symptoms until the following spring.

A. populi is an ovoid, Gram — rod, without flagella, containing a single inclusion body which appears to participate in cell division. It produces creamy colonies and a very profuse mucous substance on standard media enriched with yeast extract or peptone, which are also essential for the formation of acid on glucose, galactose, mannose, lactose, saccharose, and maltose. Gelatin is not liquefied, milk remains unchanged, and nitrates are not reduced. The opt. pH is about 6·5 and temp. 23–24° C.

Harmsen (L.), Bakshi (B. K.), & Choudhury (T. G.). **Relationship between Merulius lacrymans and M. himantioides.**—*Nature, Lond.*, **181**, 4614, p. 1011, 1958.

M. lacrymans from *Pinus sylvestris* wood in buildings in Denmark was studied at the Technological Institute, Copenhagen, and at the Forest Research Institute, Dehra Dun, and found to be heterothallic and tetrapolar.

Spores of *M. himantioides* from the bark of *Cedrus deodra* and *Picea morinda* in the western Himalayas (above 6,000 ft.), India, and from pine floor boards in Denmark germinated by putting out a germ tube directly while *M. lacrymans* spores usually germinate by the production of a vesicle. *M. himantioides* is also heterothallic and tetrapolar but clamps did not develop in any of the pairings between the 2 species, though they did in intraspecific crosses. These differences are believed to be sufficient for maintaining the 2 spp.

Ito (T.). **Pellicularia koleroga Cooke causing the thread blight of Ginkgo biloba.**—*Bull. For. Exp. Sta., Meguro*, 105, pp. 11–18, 2 pl., 3 fig., 1958. [Japanese. Abs. from English summary.]

An account is given of the morphological and physiological characters of *P. koleroga* [map 64], not before recorded in Japan, where it caused thread blight of *G. biloba* in Asakawa, Tokyo, in 1952. The symptoms of the disease are described.

Thompson (A.). **A disease of Juniper.**—*M.A.H.A. Mag.*, **15**, 1, pp. 6–7, 1 fig., 1958.

Poria punctata has been isolated in pure culture from branches of Chinese juniper (*Juniperus chinensis*) suffering from die-back in Singapore gardens. Sporophores developed on the diseased tissues.

Thomas (G. P.) & Johnson (A. L.). **Decay in young Western Larch in British Columbia.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **14**, 2, pp. 3–4, 1958.

In a study to determine the types of rot occurring in western larch [*Larix occidentalis*], to identify the associated fungi, and to find at what ages infection takes place, white pocket rot (*Fomes pini*) formed 88% of the total rot and was found in trees aged 81–90 yr. *Corticium galactinum* and *Coniophora puteana* were associated with root and butt scars while *Stereum sanguinolentum* and *F. pinicola* rots were found higher up, the 1st 3 fungi being newly recorded as wood rotting agents of this host in B.C. The abundance of infection by *F. pini* and its early establishment (sometimes in less than 30 yr.) results in premature decadence of western larch in some areas.

Rishbeth (J.). **Detection of viable air-borne spores in air.**—*Nature, Lond.*, **181**, 4622, p. 1549, 1958.

At the Botany School, Cambridge, for trapping *Fomes annosus* spores in air pieces of muslin 20 cm. sq. are used. Folded in transparent 'self sealing' envelopes they are dry-sterilized at 100° C. When required, a square is withdrawn and fixed to a wire frame (previously swabbed with 95% alcohol) with a paper-clip ('Bulldog' type) at each corner. The frame is held so that the muslin directly faces the wind. Static or moving exposures may be made. The muslin is then folded and returned to the envelope, which is re-sealed. The catch is estimated by cutting a 10 cm. square from the centre and shaking in a screw-cap bottle with 20 ml. of sterile water for 2 min. The suspension and suitable 10-fold dilutions are plated with malt agar to estimate mould spores, or transferred to sections of freshly cut pine stem [**36**, p. 505] to detect *F. annosus* and *Peniophora gigantea*, an important competitor of *F. annosus* in stumps [cf. **36**, p. 626].

By this method the 2 species have been detected in many parts of Great Britain. Of 50 exposures outside forest areas, 45 trapped *P. gigantea* and 33 *F. annosus*. When several exposures are made at one place the size of catch depends partly on the direction of the wind. *F. annosus* was demonstrated in forests from which it had not previously been reported and it was trapped 30 miles from land on the Irish Sea. A good agreement was obtained over a wide range of conditions between rate of catch and rate of spore deposition on a freshly cut, horizontal wood surface. As the number of spores trapped in moderately uniform conditions is proportional to the duration of the exposure, rate of catch may be expressed as viable spores/ 100 $cm.^2$/hr. With moulds this rate often lies in the range 200–600 for inland exposures in winter.

Peace (T. R.). **Recent observations on the rusts of Pine in Britain.**—*Quart. J. For.*, **52**, 3, pp. 196–200, 1958.

This paper has already been noticed [**36**, p. 799].

Harvey (G. M.) & Cohen (L. I.). **The extent of blister rust mycelia beyond bark discolorations on Sugar Pine.**—*Res. Note Pacif. Nthwest For. Exp. Sta.* 159, 4 pp., 1958.

From an examination of 99 *Cronartium ribicola* cankers [**37**, p. 561] collected at different times of the year from sugar pine (*Pinus lambertiana*) it was concluded that a pruning allowance of 4 in. beyond discolorations, increased to 6 in. in spring and early summer, would be sufficient to eliminate infection.

Hepting (G. H.). **A rust on Virginia Pine and Buckleya.**—*Mycologia*, **49** (*1957*), 6, pp. 896–899, 1958.

In 1955–6 *Buckleya distichophylla* trees bearing teleutosori of a *Cronartium* were found in Tennessee and N. Carolina, near *Pinus virginiana* bearing cankers of *Peridermium appalachianum* [**31**, p. 464]. When *B. distichophylla* was dusted with aecidiospores from cankers on Virginia pine uredosori developed; *B. distichophylla* is, therefore, regarded as the alternate host of *P. appalachianum*. The fungus (uredo- and teleuto- stages) is named *C. appalachianum* Hepting. The globoid to obovate uredospores average 14 (13–15) × 21 (18–23) μ; teleutospores are oblong or cylindric and 10·2 (8–12) × 32·1 (30–34) μ.

Mańka (K.) & Truszkowska (Mme W.). **Próba mykologicznej analizy korzeni Świerka (Picea excelsa Lk.).** [An attempt at a mycological analysis of roots of Spruce (*Picea excelsa* Lk.).]—*Acta Soc. Bot. Polon.*, **27**, 1, pp. 45–73, 18 fig., 1958. [German summary.]

Samples were taken from roots of 30-yr.-old spruces in Turew Poznan district, in the humus layer of 4 neighbouring trees, from the mycorrhiza, and from roots up to $\frac{1}{2}$, $\frac{1}{2}$–1, 3, and more than 3 mm. thick and cultured on different media. The greatest number of fungi was found in the mycorrhiza and in roots with secondary thickening up to 1 mm. thick. In thicker roots the number fell with increasing thickness. The isolated fungi could be roughly grouped as: (1) mycorrhizal fungi, (2) rhizosphere fungi, (3) fungi united anatomically with outermost tissues of roots. The fungi isolated from different root material varied slightly, all forming a group of definite ecological type and definite biological function. Among those found were: *Cephalosporium acremonium*, *Cylindrocarpon radicicola*, *Phytophthora* sp., *Verticillium terrestre*, and two new species.

Anderson (A. B.), Zavarin (E.), & Scheffer (T. C.). **Nature of some decay-retardant extractive components in Incense Cedar heartwood (Libocedrus decurrens Torrey).**—*Nature, Lond.*, **181**, 4618, pp. 1275–1276, 1958.

At the Forest Products Laboratory, Richmond, California, and the U.S. Forest Products Laboratory Madison, Wisconsin, 7 compounds were isolated from the heartwood of *L. decurrens*. In bioassays by the standard soil-block test, in which *Pinus ponderosa* blocks were impregnated with the compounds, 4 retarded decay by *Polyporus* [*Polystictus*] *versicolor*, the most potent being λ-thujaplicin [cf. **36**, p. 290] and hydrothymoquinone (0% wt. loss in 6 weeks), 4 retarded *Poria monticola*, *p*-methoxythymol being the most effective (20% loss), 5 retarded *Lentinus lepideus* (λ-thujaplicin, 1%), and 3 *Lenzites trabea* (λ-thujaplicin, 0%).

MacLean (H.) & Gardner (J. A. F.). **Distribution of fungicidal extractives in target pattern heartwood of Western Red Cedar.**—*For. Prod. J.*, **8**, 3, pp. 107–108, 1 fig., 2 graphs, 1958.

At the Vancouver Laboratory, Forest Products Laboratories of Canada, analysis of the natural preservative content in 'target pattern' heartwood of *Thuja plicata* [**36**, p. 438] by chemical methods indicated that the internal white rings are chemically more closely related to sapwood than to heartwood, and are deficient in fungicidal extractives. These results were consistent with the lower decay resistance of these bands in poles in service.

Henderson (F. Y.). **Report of the Director of Forest Products Research for the year 1957.**—*Rep. For. Prod. Res. Bd., Lond., 1957*, pp. 3–52, 8 pl., 1 fig., 5 graphs, 1958. 6*s*.

In the mycology section (pp. 28–31) of this report [cf. **37**, p. 123] it is stated that

treating samples of Scots pine [*Pinus sylvestris*] sapwood with chlorine water (washed out before exposure to the fungus) produced a good growth of *Chaetomium globosum* and, for the 1st time in the laboratory, wood decay of the soft rot type [**37**, p. 564], with 16% loss in dry wt. of treated blocks after 6 weeks. The opt. temp. for the growth of this fungus in beech wood was about 29° C.

No protection of Scots pine sapwood blocks against *Coniophora cerebella* [*C. puteana*] was provided by 10 min. immersion in 5% pentachlorophenol, but similar treatment with aqueous 4% sodium pentachlorophenate was more successful. Treatment with 0·02% sodium fluoride or 0·0025% $CuSO_4$ stimulated decay of such blocks by *Poria vaporaria*, the 1st treatment resulting in 33% dry wt. loss compared with 21 in the controls. $ZnCl_2$ had no stimulating effect on *C. puteana*, which at 22° can grow along the grain of moist Scots pine sapwood at 0·8 cm./day (compared with 1 cm./week along hardwood grain).

Further investigation into premature failure of seed boxes of western red cedar [*Thuja plicata*] revealed that *Merulius pinastri* can cause up to 10% loss in dry wt. in leached samples of this wood. Application of 5% sodium pentachlorophenate or sodium orthophenylphenate successfully sterilized brickwork attacked by *M. lacrymans*.

Horse-chestnut wood is proposed for testing sap stain preventatives as it (and hazel [*Corylus*] wood) becomes readily stained with *Lasiodiplodia* [*Botryodiplodia*] *theobromae*. An exposure for several hours in a saturated atmosphere at 65° or more appeared to be necessary to kill *Diplodia natalensis* on wood. *Monotospora lanuginosa*, *Thermascus aurantiacus*, and *Aspergillus fumigatus* were isolated from moist sawdust incubated at 48°; the first named made some growth at 61°. Thick bituminous coating on top of a fungicidal wash was more efficient than gasworks tar in controlling wood-rotting fungi on beech bolts [cf. **35**, p. 857].

Olson (G. E.), Meyer (F. J.), & Gooch (R. M.). **Pentachlorophenol and heavy petroleum for the preservative treatment of railway crossties.**—*For. Prod. J.*, **8**, 3, pp. 87–90, 2 fig., 1 graph, 1958.

The Dow Chemical Co. initiated laboratory tests to determine the preservative effectiveness of 2·5, 3·75, and 5% pentachlorophenol [**36**, p. 365] in QXE 493 oil (a high distilling oil of high wax content), and 50:50 creosote-petroleum. The lowest retention of the latter to inhibit decay by *Lenzites trabea* (Madison 617) was 14 lb./cu. ft. wood, compared with a min. 3·1 lb./cu. ft. for weathered rail sleepers with 2·48% pentachlorophenol. The authors point out, however, that creosote-petroleum seems to give better service performance than appears from threshold retention values frequently obtained in soil-block tests.

In this test the pentachlorophenol threshold appeared to be independent of its ratio to the QXE 493 oil, which suggested that the oil did not add to the actual effectiveness of the treatments. The lack of any great difference between weathered and non-weathered specimens indicated that the high-distilling oil very effectively inhibited the loss of pentachlorophenol during the weathering cycle.

In a 7 year stake test started in 1950 [cf. **30**, p. 552] 10 stakes were used for each treatment with 8 lb. retention/cu. ft. and installed in 2 test plots, one in Texas and one in Louisiana. Further support was found for the concept that the 5% pentachlorophenol-petroleum can be extended in the same way as creosote has been extended in the past. The data obtained indicate that the conditions of this stake test may more nearly approach actual service conditions. It was noted that 101-E oil used as a control also gave good results.

In 1952 the Dow Chemical Co. started a co-operative test programme with 10 leading railroads, each of which sent 500 sleepers to the treating plant at Franklin Park, Illinois; 8 sent mixed oak and 2 Pacific Coast Douglas fir [*Pseudotsuga menziesii*]. These were pressure treated, 100 with 101-E oil alone, and 100 with

2, 3, 4, and 5% pentachlorophenol in 101-E oil. The pentachlorophenol sleepers are wearing well.

GUILLEMAIN-GOUVERNEL (Mme J.) & HEUZÉ (J.). **Absorption comparée de produits de préservation dans le bois initial et le bois final chez Pinus sylvestris L.** [Comparative absorption of preservatives in the early and late wood of *Pinus sylvestris* L.]—*Chim. & Indust.*, **79**, 1, pp. 23–25, 1958. [English and Spanish summaries.]

The amounts of pentachlorophenol absorbed (based on the wood vol.) by samples $3 \times 1 \times 0{\cdot}5$ cm. were practically twice as large in late as in spring wood (0·7–1 and 0·4–0·5 g./cc., respectively); a result related to the structure, the spring wood containing 50% open pits, the late wood 70%. Pentachlorophenol crystals were detected under white and polarized light in tangential sections from impregnated test pieces.

GÖHRE (K.). **Versuche zur Imprägnierung von Kiefernkernholz mit Teeröl.** [Experiments on the impregnation of Pine heartwood with tar oil.]—*Holz. a. Roh- u. Werkst.*, **16**, 1, pp. 22–27, 19 fig., 1958.

In further studies of wood preservation methods at the Institut für Physikalische Holztechnologie, Eberswalde, Germany [**36**, p. 76], a series of tests was made on pine with tar oil by the pressure process. Sap and heartwood were sufficiently impregnated when heated at a moisture content of 12% or less, with a final temp. of above 100° C. The end temp. of wood specimens with large cross sections had to be restricted to 110° in order to prevent cracks forming. Heating smaller specimens up to 140° yielded good results, but tar oil absorption was less satisfactory above 160°. The wood was heated either with a high frequency alternating field or by contact heat transfer. With the latter, preliminary treatment had to be prolonged. Oil temp. of 110–120° were sufficient. The summer wood was satisfactorily impregnated and usually sufficient quantities could be introduced into the spring wood. It was also possible to impregnate pine heart wood attacked by *Trametes pini* [**22**, p. 413] by using the Rüping method [**32**, p. 654] with a pressure time of 2 hr. Tests with samples of impregnated wood demonstrated their immunity from attack by *Lentinus lepideus* [**36**, p. 76].

AMENIYA (S.) & INOUE (M.). **Research for wood preserving treatment (1). Temperature change in timbers heated and cooled with water solution of a preservative, and treating condition of hot and cold-bath treatment, with the same solution.**—*Bull. For. Exp. Sta, Meguro*, 106, pp. 179–200, 5 fig., 11 graphs, 1958. [Japanese. Abs. from English summary.]

In this study of the absorption of Wolman salts by well-seasoned round timbers of *Pinus densiflora*, placed in a hot bath (at 90° C.) of the preservative (at 1·25%) and then cooled rapidly by transference to a cold bath (20–30°), the object was to establish a relationship between the temp. reached by the wood (measured by thermo-couple) and the level of salt uptake. Given equal periods of heating and cooling both absorption and penetration increased with increase of the heating period. With timbers of 17 and 5 cm. diam. the centre reached the temp. of the hot bath in 6 and 3 hr., respectively, and good absorption and penetration were achieved. Even with a short period in the hot bath a higher absorption was gained by lengthening the time in the cold bath. For the slow cooling method the hot bath and its contained timbers were allowed to cool down to room temp. With equal cooling times this method gave the better absorption, but the rapid method was as good when the time in the cold bath was prolonged. In general it was more effective to prolong the cold bath than the hot bath treatment.

SHIMAZONO (H.), SCHUBER (W. J.), & NORD (F. F.). **Investigations on lignins and lignification. XX. The biosynthesis of methyl *p*-methoxycinnamate from specifically labelled D-glucose by Lentinus lepideus.**—*J. Amer. chem. Soc.*, **80**, 8, pp. 1992–1994, 1958.

The metabolism of *L. lepideus* [**19**, p. 448] is regarded as highly interesting in view of an enzyme system present capable of decomposing wood. At the Dept of Organic Chemistry, Fordham University, New York, the fungus was grown on media containing 1–C^{14} D-glucose and 6–C^{14} D-glucose, both of which were incorporated into methyl *p*-methoxycinnamate, a normal metabolic product. The results of further comparative studies on the activity of the esters produced by the 2 compounds indicated that a pathway other than glycolysis was operative in the metabolism of glucose by *L. lepideus.*

DENYER (W. B. G.). **The effect of *o*-phenylphenol on the growth of some wood-rotting fungi.**—*Bi-m. Progr. Rep. Div. For. Biol., Dep. Agric. Can.*, **14**, 1, pp. 2–3, 1958.

It was found that several brown cubical decay fungi, including *Coniophora puteana*, were inhibited on media containing *o*-phenylphenol, which has been recommended for retarding mould growth on media used for isolating wood-rotting fungi [**35**, p. 698].

PLICHET (F.). **Le problème du Noyer en Dordogne.** [The Walnut problem in Dordogne.]—*Rev. hort., Paris*, **130**, 2222, pp. 1806–1810, 6 fig., 1958.

Notes are given on the symptoms and control of anthracnose (*Gnomonia leptostyla*) [cf. **28**, p. 315] and bacteriosis (*Phytomonas* [*Xanthomonas*] *juglandis*) [map 133] of walnut locally. Anthracnose occurs on most varieties, but appears to be most important in the E. of the area, where var. Marbot is grown. The ascigerous state is present in spring not only on dead walnut leaves, but on the roots of the weed *Mercurialis perennis.* Control of *X. juglandis* is secured by a copper spray applied before flowering and at fruit set; if the season is very wet, a 3rd application may be made when the nuts are 1–2 cm. diam.

FREEMAN (H.). **Bacterial blight of Walnuts.**—*J. Dep. Agric. Vict.*, **56**, 4, pp. 247, 249, 1 fig., 1958.

In a trial at Gapsted, Victoria, in 1953–4 the Oregon spray schedule (5–2–100 Bordeaux mixture+$1\frac{1}{4}$ pint white oil) for the control of walnut blight (*Xanthomonas juglandis*) [cf. **27**, p. 205 and below] was compared with dithane Z-78 (2 lb.+oil). The percentages of diseased (unmarketable) nuts were 13·1 and 22·4 for the 2 schedules, with 31·3 for the unsprayed. In 1954–5 the corresponding figures were 16·1, 57·4, and 66%, while those for No. 1 Grade nuts (unblemished) were, respectively, 78·3, 36·4, and 28·5%. The Oregon schedule is therefore recommended for use in Victoria.

MILLER (P. W.). **Recent studies on the effectiveness of agri-mycin 100 and agri-mycin 500 for the control of Walnut blight in Oregon.**—*Plant Dis. Reptr*, **42**, 3, pp. 388–389, 1958.

Tests by the U.S. Dept Agric. and Oregon Agricultural Experiment Station in 1956–7 with agrimycin 100 and 500 for the control of walnut blight (*Xanthomonas juglandis*) [cf. **35**, p. 616] showed agrimycin 100 to be ineffective. Three applications of agrimycin 500, a formulation containing Cu, at the rate of $\frac{1}{2}$ lb./100 gal. gave relatively good control, reducing infection from 39 to 6% (4 reduced it to 3%). This was practically as effective as the standard Cu sprays and easier to use, though Bordeaux mixture 4–2–100, yellow cuprocide 1–100, and copper A compound 2–100 have given more consistent control in epidemic years.

Lentz (P. L.). **Taxonomy of the Pecan scab fungus.**—*Mycologia*, **49** (*1957*), 6, pp. 874–878, 1 fig., 1958.

As *Cladosporium effusum* (Wint.) Demaree [**8**, p. 114] is a later homonym of *C. effusum* Berk. & Curt. and therefore cannot be used as a name for the pecan scab fungus, the author re-examines the morphological relationships of the organism and concludes that it is proper to call it *Fusicladium effusum* Wint. [cf. **33**, p. 384].

Converse (R. H.). **A comparison of protectant fungicides for Pecan scab control in Oklahoma in 1957.**—*Plant Dis. Reptr*, **42**, 3, pp. 390–392, 1958.

In further trials by the U.S. Dept Agric. and Oklahoma Agricultural Experiment Station, Stillwater, with 7 protectant sprays for the control of scab (*Fusicladium effusum*) on pecan nuts [cf. **36**, p. 504], dyrene (50% 2,4-dichloro-6-(*o*-chloroanilino)-S-triazine; Chemagro Corp.) gave almost complete control. None of 5 dithiocarbamates tested was significantly better than zerlate (0·7% average scabbed shuck; control 12·9) but manzate may prove more effective on further trial.

Converse (R. H.). **Evidence for the existence of physiologic specialization in Mycosphaerella caryigena.**—*Plant Dis. Reptr*, **42**, 3, pp. 393–395, 1958.

At Oklahoma Agricultural Experiment Station, Stillwater, inoculum of the downy spot pathogen (*M. caryigena*) [**11**, p. 551; **34**, p. 759] from the pecan var. Stuart failed to produce as many lesions on 4 other vars. which had appeared equally susceptible in a field test, indicating the existence of more than 1 race of the fungus. Perithecia were not found on overwintered leaves in Oklahoma, while *Cercosporella* type conidia from overwintered lesions were not viable.

Freyschuss (S. K. L.). **Bekämpning av svampangrepp i slipmassa.** [Control of fungal infection in mechanical pulp.]—*Norsk Skogind.*, **12**, 3, pp. 104–113, 7 fig., 1958. [English summary.]

Recent information on the comparative efficiency of various organic mercurials against *Pullularia pullulans*, *Penicillium roqueforti*, *Aspergillus niger*, *Trichoderma viride*, *Paecilomyces varioti*, *Cladosporium cladosporioides*, and *Fomes annosus* in groundwood mills is presented. Besides the new combined treatment with oxine [8-hydroxyquinoline] and phenylmercuric acetate [**35**, p. 801; **37**, p. 426–7], methyl mercuric hydroxide has proved efficient as a fungicide, and it also gives rise to lower Hg vapour concentrations in the mill atmosphere than does phenylmercuric acetate.

Leyendecker (P. J.) & Jones (M. B.). **Aster yellows and curly top on vegetables in New Mexico.**—*Plant Dis. Reptr*, **42**, 1, pp. 42–43, 1958.

At the New Mexico College of Agriculture and Mechanic Arts lettuce planted on 23 July developed 38–63% infection by aster yellows virus [**36**, p. 9], whereas plantings on 2 and 13 Aug. lost not more than 1–2%. Two years' testing of spinach varieties indicates that planting in late Aug. in the Mesilla Valley is impracticable because of the high incidence of [beet] curly top virus.

McLean (D. M.). **Some experiments concerned with the formation and inhibition of apothecia of Sclerotinia sclerotiorum (Lib.) D By.**—*Plant Dis. Reptr*, **42**, 4, pp. 409–412, 1958.

At the U.S. Dept Agric., Mount Vernon, Washington, it was found that apothecia of *S. sclerotiorum*, a pathogen of cruciferous seed plants [**28**, p. 555], developed from sclerotia in moist sand, soil, sphagnum, and 1% agar. In amber and black painted bottles only stipes developed. Sclerotia buried 6–8 in. in soil remained viable

and produced apothecia after 5 yr. Disintegration of sclerotia was more rapid in moist sand than in moist soil and also nearer the soil surface, and only partial destruction resulted from burning crop refuse. Of a number of compounds tested as soil treatments only calcium cyanamide and mylone completely inhibited the formation of apothecia but terraclor and vapam were highly effective.

McLean (D. M.). **Role of dead flower parts in infection of certain crucifers by Sclerotinia sclerotiorum (Lib.) D By.**—*Plant Dis. Reptr*, **42**, 5, pp. 663–666, 2 fig., 1958.

At Mount Vernon, Washington, investigations on infection by *S. sclerotiorum* [see above] on broccoli, cauliflower, and cabbage showed that infection at the leaf axil from mycelial mats on potato dextrose agar or from sclerotia occurred only through abrasions or when dried broccoli flower parts were present. Potted plants exposed to ascospores from apothecia in a humidifier developed infections only at the sites of dead flower parts on the leaves. When cabbage inflorescences were similarly exposed the mature, open flowers became infected before falling.

Natti (J. J.). **Resistance of Broccoli and other crucifers to downy mildew.**—*Plant Dis. Reptr*, **42**, 5, pp. 656–662, 1958.

At the New York State Agricultural Experiment Station, Geneva, cotyledon inoculation provided a rapid greenhouse method for distinguishing crucifer seedlings highly resistant to *Peronospora parasitica* [**37**, p. 255]; moderate resistance was best detected by inoculation at the 3- to 4-leaf stage. Five collections of *P. parasitica* from naturally infected broccoli from different localities in New York appeared to be of the same physiologic race. All commercial vars. of *Brassica oleracea* with the exception of var. *fimbriata* (kale) were susceptible to this race, whereas all the other horticultural crucifers tested were either resistant or immune. The broccoli P.I. 231210 was highly resistant. Resistant seedlings were found among the cauliflower introductions P.I. 208474, 208478, 208482, 209751, 209754, 207956, and 222971.

Altman (J.) & Davis (B. H.). **Experiments on the control of downy mildew of Broccoli and bacterial spot of Lima Beans with streptomycin.**—*Plant Dis. Reptr*, **42**, 4, pp. 416–419, 1958.

Trials at Rutgers University, New Brunswick, New Jersey, indicated that downy mildew (*Peronospora parasitica*) of broccoli [**36**, p. 676] was significantly reduced by 5 applications of streptomycin nitrate, weekly, at 50 and 100 p.p.m., with or without 1% glycerine. Above 100 p.p.m. was phytotoxic, but recovery took place. *Pseudomonas syringae* on Lima beans [*Phaseolus lunatus*: cf. **36**, p. 744] was significantly reduced by 3 applications at 200 p.p.m. at 5 day intervals, but the economic value of this treatment was doubtful.

Cetas (R. C.). **The use of sodium methyl dithiocarbamate for the control of club root of crucifers.**—*Plant Dis. Reptr*, **42**, 3, pp. 324–328, 1958.

In tests at Cornell University, New York, with VPM (31% sodium methyl dithiocarbamate) against *Plasmodiophora brassicae* [**37**, p. 565] a drench of 1 qt./100 sq. ft. gave good weed control and almost perfect control of disease on Chinese cabbage. Broadcast application of similar amounts with shank and blade type applicators followed by 1 in. of water by overhead irrigation 1 month before setting out the cabbage and cauliflower gave similarly good control. Band application (1 lb./100 lineal ft. row) with 1 shank of a shank applicator, followed immediately by 1·5 in. of water by overhead irrigation 1 month before setting out, gave a 16 in. weed-free band, satisfactory plant growth, and good clubroot control.

Kupryanova (Mme V. K.). Меры борьбы с болезнями семенников Капусты. [Measures for the control of Cabbage diseases.]—*Plant Prot. Moscow, 1957*, 5, pp. 28–29, 1957.

In the Lujskaya area, Leningrad region, U.S.S.R., in 1954–1956, tests for the control of *Alternaria brassicae* [**36**, p. 627], *Peronospora brassicae* [*P. parasitica*: **35**, p. 255], and *Phoma lingam* [loc. cit.] on cabbage, showed that plants transplanted between 26–30 June were more resistant than the earlier ones. Fertilizer containing 50% humus, 45% peat, and 5% mullein with 3·9 g. ammonium nitrate, 4·3 g. KCl, and 8·1 g. superphosphate/100 added to 110 g. organic matter applied to the soil reduced the percentage of diseased plants better than the organic manure alone.

Friedman (B. A.), Ringel (S. M.), & Jaffe (M. J.). **Bacterial fleck of Cabbage.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 261, 1958.

The occurrence of fleck-like, circular to elongate, grey, brown, or black spots, often scattered over both leaf surfaces of cabbage and Chinese cabbage occasionally causes serious losses in the U.S.A. Lesions are confined to the epidermis and a few underlying cells. *Pseudomonas maculicola*, *P. fluorescens*, *P.* sp., and 3 *Bacterium* spp. were isolated and in water suspension reproduced the symptoms at 35 and 70° F. Normally rain, dew, or condensation provides the necessary moisture in the field, in transit, or in storage.

Mathews (R. E. F.). **Studies on the relation between protein and nucleoprotein particles in Turnip yellow mosaic virus infections.**—*Virology*, **5**, 2, pp. 192–205, 4 graphs, 1958.

In further work at the Plant Virus Research Unit, Molteno Institute, Cambridge [cf. **36**, p. 156], the ratio of numbers of virus nucleoprotein particles to protein in Chinese cabbage, var. Wong Bok, infected with turnip yellow mosaic virus remained close to 2:1 under a wide range of growing conditions. It did not change significantly from the earliest stage of infection at which crystalline virus could be isolated to the time when plants contained maximal amounts of virus, and were approaching senescence. Healthy leaf tissue may contain up to 3 mg. ribonucleic acid/g. fresh weight, but infected leaves have more, the increase being entirely accounted for by that in combination in the virus.

Natti (J. J.). **Verticillium wilt of Broccoli and Cauliflower in New York.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 264, 1958.

Seedlings of 15 vars. of broccoli and 3 of cauliflower, the roots of which were dipped in a culture of *V. albo-atrum* isolated from tomato, developed yellowing, often unilateral, of the lower leaves and blackening of the vascular strands within 14–30 days in the greenhouse. Similar symptoms occurred in field plots known to be infested with this pathogen. Infected plants were not stunted nor were yields affected. Broccoli plants inoculated with isolates from naturally infected broccoli and cauliflower developed similar symptoms to those caused by the tomato strain.

Mackinnon (J. P.) & Bradley (R. H. E.). **Aphids remain infective with Turnip-latent virus after a molt.**—*Canad. J. Microbiol.*, **4**, 1, pp. 63–64, 1958.

In experiments with turnip-latent virus [*Physalis floridana* yellow net virus: **35**, p. 500] at the Canada Dept Agric., Ottawa, *Myzus persicae* continued to transmit the virus after moulting [cf. **35**, p. 707] and was more apt to transmit on moulting days than at other times. The virus is apparently not passed from infective aphids to their young, which do not ingest enough virus to become infective during 24 hr. feeding on a newly infected plant, but nymphs born on plants infected over 3 weeks became infective after feeding for a few hours. Aphid transmission after moulting

indicated that the virus is not carried by the stylets, which are shed in the process and replaced by newly formed ones [cf. **37**, p. 69].

TOMLINSON (J. A.) & WEBB (M. J. W.). **Control of Turnip and Cabbage mildew (Erysiphe polygoni DC.) by zinc.**—*Nature, Lond.*, **181**, 4619, pp. 1352–1353, 1 fig., 1958.

Turnip plants were grown in a glasshouse at the National Vegetable Research Station, Wellesbourne, Warwick., in pots of soil either containing various proportions of Zn fritted glass (Zn frit) [**37**, p. 511] or watered with solutions of $ZnSO_4$ and inoculated by depositing spores of *E. polygoni* on the upper leaf surface at 0–1·5 spores/sq. mm. Infection was considerably less on plants grown in soil with 1 and 10% (w/w) Zn frit than on those in untreated soil. Plants given 1% Zn frit were less infected in 5-in. than in 3-in. pots. Those with 10% Zn frit became chlorotic and stunted, but those given 0·1 and 1% were not. The Zn content of the leaf fresh-matter of untreated plants and plants in soil containing 0·1 and 1% Zn frit was 2·3, 5·5, and 21·8 p.p.m., respectively.

In another trial turnip plants in untreated soil were heavily mildewed after 63 days but in soils containing 1 or 2% Zn frit or those watered with solutions of $ZnSO_4$ (500 p.p.m. Zn) were only very slightly infected.

In a 3rd test the new leaves of heavily infected, 8-week-old turnip plants which had been receiving 500 p.p.m. Zn for 5 weeks remained uninfected, whereas those on plants in the other 2 treatments became heavily infected. This effect continued for 5 months and, as the old leaves dropped off, the treated plants became healthy. The results obtained with cabbage were similar, whereas with cucumber, chrysanthemum, and vegetable marrow there was no reduction in the amount of mildew (*E. cichoracearum*) [**37**, p. 201], which suggests that the latter is more tolerant of high Zn concentrations than *E. polygoni*.

HULL (R.). **Sugar beet yellows. The search for control.**—*Agriculture*, **65**, 2, pp. 62–65, 1958.

Losses in Great Britain from sugar beet yellows virus [**37**, p. 385] in 1957 were about 1,000,000 tons, being heaviest in the S.E. This was due to the mild winter of 1956–7 when susceptible weeds acted as reservoirs of infection and to the large number of aphid-infested mangold clamps. The development of the systemic insecticide dematon-methyl offers promise as a means of controlling the vector. One spray applied during the early stages of colonization of the crop by *Myzus persicae*, i.e. during early June, resulted in an increase of $1\frac{1}{4}$ tons/acre, a later spray gave an additional $\frac{1}{4}$ ton. Early-sprayed plots yielded 13% more sugar/acre and twice-sprayed plots 17% more than unsprayed. In a similar experiment in a heavily infested area the figures were 29% and 36%. Warnings are issued when aphids become prevalent, but in areas where yellows occurs regularly spraying should be a routine measure.

In a varietal field trial in Suffolk in 1957 2 tolerant progenies exposed to natural infection outyielded Battle's E by 13 and 16% and Sharpe's Klein E by 27 and 30%, and developed symptoms less rapidly.

[For another account of this work see: R. HULL, Sugar Beet Yellows in 1957. *Agric. Rev.*, **3**, 10, pp. 19–22, 1958.]

MUNDRY (K. W.) & ROHMER (IRMGARD). **Über die mechanische Übertragung des Vergilbungsvirus der Rüben.** [On the mechanical transmission of Beet yellows virus.]—*Phytopath. Z.*, **31**, 3, pp. 305–318, 1 fig., 1 graph, 1958.

In experiments at the Institut für landwirtschaftliche Technologie und Zuckerindustrie, Brunswick, Germany, beet yellows virus [**34**, p. 693] was mechanically transmitted to appropriately preconditioned (4 days in the dark) sugar beet test

plants, var. Kleinwanzleben E 9819, necroses developing at the point of inoculation. Similar results were also obtained on *Chenopodium foliosum.* Inoculation was carried out immediately after taking the plants out of the dark by carborundum abrasion of the upper leaf surface. The leaves were then thoroughly rinsed on both sides in running water and the plants placed in a greenhouse under normal conditions. However, the temp. in the greenhouse after inoculation should not be too high, though 25° C. was well tolerated.

The results of these infection experiments, serological tests, and electron-microscope investigations no longer leave any room for doubt of the uniformity of beet yellows virus or of its form and dimensions.

Sylvester (E. S.). **Beet yellows virus transmission by the green peach aphid.**—*J. econ. Ent.*, **49**, 6, pp. 789–800, 2 graphs, 1956.

In further studies on the vector-virus relationship of beet yellows and *Myzus persicae* [**35**, p. 861] the min. period for virus acquisition was 1 hr., with max. efficiency after 12 hr. of feeding; the min. interval for inoculation threshold was 1 hr., and max. inoculation efficiency was attained after 6 hr. In retention experiments the half-life of yellows virus within feeding aphids was 8 hr.; during this period transmission of yellow-net virus [cf. **35**, p. 585] increased gradually. In fasting aphids the half-life was 2·5 hr. Single insects could carry yellows and yellow net viruses together, but were unable to infect individual beets with both during the 8 hr. feeding period. Dual infection was obtained by feeding many insects on one plant.

The best sources of yellows virus were the leaves of symptomless infected plants. The opposite was true for yellow-net. In dually infected plants the intensities of the 2 virus sources had no bearing on one another. In the vector the character of infectivity depended on the terminal acquisition feeding.

If groups of infective aphids were used to determine the influence of the number of infective aphids on the probability of transmission, the latter was constant; the constancy was broken when non-infective aphids were introduced.

The author classifies yellows virus in the semi-persistent group of aphid-borne viruses.

Marx (Ruth). **Zur Übertragung des Rübenmosaikvirus durch Blattläuse.** [On the transmission of Beet mosaic virus by aphids.]—*Phytopath. Z.*, **31**, 4, pp. 437–440, 1958.

Myzodes [*Myzus*] *persicae* and *Doralis* [*Aphis*] *fabae* were used in comparative greenhouse tests in the spring of 1955 at the Zweigstelle Rosenhof des Max-Planck-Institutes für Züchtungsforschung, Ladenburg (Neckar), Germany, for the transmission of beet mosaic and yellows viruses [**37**, p. 385] separately and together to sugar beet plants (Kleinwanzlebener N). The transmission frequency of the former was the same alone or for the mixture. There was also no apparent difference in the infection rate of the 2 aphids.

Coons (G. H.), Stewart (D.), Bockstahler (H. W.), & Schneider (C. L.). **Incidence of savoy in relation to the variety of Sugar Beets and to the proximity of wintering habitat of the vector, Piesma cinerea.**—*Plant. Dis. Reptr*, **42**, 4, pp. 502–511, 1 fig., 2 diag., 1958.

Savoy virus disease of sugar beet, transmitted by *P. cinerea* [**30**, p. 595], was found to a far greater extent in a field in Ohio in 1952 and one in Minnesota in 1955 than previously noted, the amount of infection falling (from 9·2 and 20% on the borders of the respective fields) in accordance with the distance from neighbouring potential winter quarters of the vector. Resistance was shown by U.S. 215×216 and U.S. 104×U.S. 400.

Cornford (C. E.). **Oospores of Peronospora schachtii found in England.**—*Plant Path.*, 7, 1, p. 38, 1 fig., 1958.

Of 267 leaves from 20 sugar beet plants infected by *P. schachtii* [**36**, p. 816], examined at the Rothamsted Field Station, Dunholme, Lincoln, in 1956, 70 from 11 plants contained oospores. These leaves were 2–3 in. long; some were brown or shrivelled, others were green and bore living conidiophores.

Koch (F.). **Ein Feldversuch zur Frage der Lebensdauer von Cercospora beticola im Boden.** [A field experiment on the question of the longevity of *Cercospora beticola* in the soil.]—*Zucker*, **11**, 10, pp. 237–238, 1958.

An experiment undertaken by a working-party for the control of sugar beet diseases at Regensburg, Germany, was designed to answer the question raised by Knapp regarding the period of viability of *C. beticola* in the soil [**34**, p. 336]. In a field where a regular 6-yr. rotation was practised 25 sq. m. of the soil was inoculated (2 g./sq. m.) with ground, desiccated, infected leaves on 17 Nov. 1953. By 3 Aug. 1954 all the plants within the infected area were diseased, whereas those in the surrounding zone developed only mild secondary symptoms which rapidly diminished in intensity with increasing distance from the focus. In 1955 the plants on the inoculated plot were still recognizable by earlier and more severe symptoms than those occurring elsewhere, but neither in 1956 nor 1957 (when the damp, cool summer was favourable to the pathogen) did any infection develop. Evidently, therefore, the survival period of *C. beticola* in the soil does not exceed 2 yr. under local conditions, and consequently leaf spot should not rank as a typical rotational disease.

Sneep (J.). **The present position of Spinach breeding.**—*Euphytica*, **7**, 1, pp. 1–8, 4 fig., 1 graph, 1958. [Dutch summary.]

Included in the spinach breeding projects at the Institute of Horticultural Plant Breeding, Wageningen, is the search for disease-resistant lines. Resistance to *Peronospora spinaciae* [*P. effusa*: cf. **36**, p. 507] depends on one dominant factor, as does resistance to mosaic [cucumber mosaic virus: loc. cit.; cf. **36**, p. 749], but in the latter it has no effect during high temperatures. A simple method of testing young spinach plants for resistance to *P. effusa* with sheets of polyethylene has been devised. Search for resistance to *Albugo occidentalis* [cf. **18**, p. 367; **32**, p. 419] should be continued.

McWhorter (F. D.) & Cook (W. C.). **The hosts and strains of Pea enation mosaic virus.**—*Plant Dis. Reptr*, **42**, 1, pp. 51–60, 6 fig., 1 map, 1958.

Field studies in the Milton area of Oregon showed that irrigated lucerne is the principal source both of pea enation mosaic virus [**35**, p. 806] and its aphid vector (*Macrosiphum pisi* [*Acyrthosiphon pisum*]). Aphid control on lucerne in early spring has reduced losses in the pea fields. In infected lucerne conspicuous, hyaline, windowlike areas in the leaves are produced by sheets of highly specialized cells extending from the veins and veinlets. *Trifolium subterraneum* is a natural host; beans (*Phaseolus vulgaris*) can be infected but are considered unimportant hosts. The virus is remarkably constant wherever it occurs.

Buxton (E. W.). **A change of pathogenic race in Fusarium oxysporum f. pisi induced by root exudate from a resistant host.**—*Nature, Lond.*, **181**, 4617, pp. 1222–1224, 2 graphs, 1958.

In further studies at Rothamsted Experimental Station a culture of race 1 of *F. oxysporum* f. *pisi* [**36**, p. 629] was induced to behave like race 2, in that it wilted Wilt-Resistant Alaska pea, by 14 days' incubation of the spores in root exudate of that var. Pathogenicity was increased more by a concentrated than by a dilute exudate: sterile water had no effect. Re-isolations and re-inoculations over a

period of 24 days showed that virulence was maintained at the 2 levels. Further, the 100% ability normally shown by race 1 to wilt Onward was reduced to 73% by the treatment.

LYALL (L. H.) & WALLEN (V. R.). **The inheritance of resistance to Ascochyta pisi Lib. in Peas.**—*Canad. J. Pl. Sci.*, **38**, 2, pp. 215–218, 1958.

In a breeding programme at the Canada Dept Agric., Ottawa, the pea line Ottawa A–100 resistant to *A. pisi* [**35**, p. 421] was crossed with the susceptible Thomas Laxton. Resistance to the pathogen was conferred by duplicate dominant genes, either of which gives resistance.

STENTON (H.). **Colonization of roots of Pisum sativum L. by fungi.**—*Trans. Brit. mycol. Soc.*, **41**, 1, pp. 74–80, 1958.

At the University of Hull, the colonization of pea roots by soil fungi was investigated by sowing surface-sterilized seeds in pots or garden soil and sampling at intervals over a period of 87 days. The laterals and nodules were removed from the first 4 cm. of tap root below the cotyledon and soil particles washed away with a strong jet of tap water. After shaking in 10 changes of sterile streptomycin sulphate solution (51·8 units/ml.) the root lengths were cut into 2 mm. sections under aseptic conditions and plated on Czapek-Dox+0·5% yeast extract agar.

Over 40 different fungi were isolated; *Cylindrocarpon* was the most abundant, occurring 635 times on a total of 68 root lengths and equally frequently on the upper and lower sections. Species of *Fusarium* were isolated 278 times, *Pythium* 119, *Gliocladium roseum* 107, and *Mortierella* 73.

Most of the 2 mm. sections yielded only 1 fungus; more were isolated with increasing age. Colonization was initially patchy and areas already occupied were not readily invaded by a different species. Most of the isolates possessed slimy spores.

HENKENS (C. H.). **Voorkómen van kwade harten in Erwten door bespuiting met mangaansulfaat.** [Prevention of marsh spot in Peas by spraying with manganese sulphate.]—*Landbouwvoorlichting*, **12**, 6, pp. 262–265, 1 fig., 1958.

It is concluded from the results of experiments at the Instituut voor Bodemvruchtbaarheid, Groningen, Netherlands, that the best time for the application of manganese sulphate (1·5%, 1000 l./ha.) for the control of marsh spot [**18**, p. 777] is at full bloom with a supplementary treatment (essential in severe cases) when flowering is coming to an end.

WELKIE (G. W.) & POUND (G. S.). **Temperature influence on the rate of passage of Cucumber mosaic virus through the epidermis of Cowpea leaves.**—*Virology*, **5**, 2, pp. 362–370, 2 fig., 3 graphs, 1958.

This work has already been noticed [**37**, p. 127].

QUANTZ (L.). **Untersuchungen zur Bestimmung mosaikresistenter, überempfindlicher Gartenbohnensorten (Phaseolus vulgaris L.) im Labortest.** [Investigations into the determination of mosaic resistant, hypersensitive garden Bean varieties (*Phaseolus vulgaris* L.) by laboratory test.]—*Phytopath. Z.*, **31**, 3, pp. 319–330, 4 fig., 1958. [23 refs.]

By a rapid method for testing resistance to bean mosaic virus [see **37**, p. 259] it was possible, at the Institut für Landwirtschaftliche Virusforschung, Brunswick, Germany, to ascertain the hypersensitive vars. from a selection of 38 bush and 29 climbing vars. The method proved sufficiently reliable in comparison with the 'whole plant' method of Thomas and Fisher [**34**, p. 123] and the grafting method. There was also considerable agreement between laboratory and field findings.

The following were resistant: Great Northern U.I. 15, Métis, Saint Marcellin,

Erfurter Speck, Genfer Markt, Kaboon, Saxa, Sultan, Wachs Rheinland, Bon jardinier de Mont Calme, Pinto No. 72, Probator, Red Mexican No. 34, Weisse Riesen, Blauhülsige Speck, Kapitän Weddigen, Haubners Mansfelder Gold, Meisterstück, Phänomen, Progress, Wachs Goldbohne, Wachs Goldkrone, Haubners Wachsschwert, and Zucker Perl Prinzess.

Rudorf (W.). **Ein Beitrag zur Genetik der Resistenz gegen das Bohnen-Mosaikvirus I.** [A contribution to the genetics of resistance to Bean mosaic virus I.]—*Phytopath. Z.*, **31**, 4, pp. 371–380, 4 fig., 1958. [19 refs.]

A new bush bean (*Phaseolus vulgaris*) var. (selection Bo 19 from a collection of wild beans from Russia) resistant to bean mosaic virus (Voldagsen strain) [**34**, p. 338] was discovered by testing a large assortment at the Max-Planck Institut für Züchtungsforschung, Köln-Vogelsang, Germany. It is resistant both to mechanical inoculation and grafting, and is also immune from *Phytomonas* [*Pseudomonas*] *medicaginis* var. [f. sp.] *phaseolicola* [**35**, p. 572]. In crosses and back-crosses with the susceptible Saxa Stringless bi-factorial differences from the parent varieties were observed, the F_2 ratios being 15 susceptible: 1 extreme resistance (i). The gene formula of Saxa is taken to be A S i [**29**, p. 487] and that of Bo 19 a s i. The F_2 from Top crop (hypersensitive) $\times$ Bo 19 was 9 hypersensitive: 3 susceptible: 4 resistant (i).

Schneider (I. R.) & Worley (J. F.). **Effect of high temperature on site and extent of multiplication of southern Bean mosaic virus.**—*Phytopathology*, **48**, 5 (1), pp. 244–248, 1 fig., 1958.

A comparison of 32° and 21° C. on bean southern mosaic virus in sap-inoculated, detached leaves of Kentucky Wonder and Kentucky Wonder Wax beans (*Phaseolus vulgaris*) was made at Beltsville [cf. **36**, p. 294]. High temp. in the dark induced vein necrosis on primary leaves, which increased, with decrease in the number of isolated local lesions, the longer the exposure. Often 72 hr. exposure immediately after inoculation confined the necrosis entirely to the veins and veinlets. The longer high temp. treatment was delayed, the less the necrosis was associated with the veins; with a 72-hr. delay only local lesions occurred, even after subsequent treatment for 72 hr. Heat treatment for 24 hr. before inoculation increased the number and size of the local lesions; veinal necrosis also occurred occasionally and more often with a 48- or 72-hr. period.

Assay of ground leaf disks on Pinto beans showed much larger amounts of virus to be present in necrotic than in adjacent non-necrotic areas, which sometimes lacked detectable virus altogether. Necrotic areas from leaves held at high temp. for 24 hr. contained more virus than those at low temp., the longer periods resulting in further increases, and necrotic vein areas contained more virus than local lesions. At the low temp. max. virus multiplication occurred in the interveinal areas, at high temp. in the veinal areas.

Schneider (I. R.) & Worley (J. F.). **Apparent movement of southern Bean mosaic virus across steamed areas of Bean stems.**—*Science*, **127**, 3305, pp. 1050–1051, 1 fig., 1958.

At the Crops Research Division, Beltsville, Maryland, it was shown that bean southern mosaic virus [**36**, p. 295] or some part of the virus initiating infection passed through a steamed stem section of a Pinto bean (*Phaseolus vulgaris*) plant approach-grafted [**31**, p. 163] below the primary node to a Black Valentine bean plant which was inoculated with the virus.

Wilson (E. M.). **Rust-TMV cross-protection and necrotic-ring reaction in Bean.**—*Phytopathology*, **48**, 4, pp. 228–231, 2 fig., 1 graph, 1958.

At the University of California, Berkeley, when bean (*Phaseolus vulgaris*) leaves

infected by rust (*Uromyces phaseoli typica*) [*U. appendiculatus*] were inoculated with tobacco mosaic virus (TMV) the number of virus lesions decreased as the interval between the 2 inoculations increased, in correlation with the maturity of the pustules. Aqueous diffusates of uredospores sprayed onto bean leaves before inoculation gave, according to the conc. of the diffusate, up to 68% control of the virus and up to 81% control of subsequent rust infection [cf. **36**, p. 159].

Similarly, when bean leaves with local TMV lesions were inoculated with the rust no pustules developed on the virus-infected tissue, which was shown to inhibit spore germination. Inoculation with the virus a day or more after rust inoculation did not have this effect. Aqueous diffusates from virus infected leaves sprayed onto healthy bean leaves gave up to 72% control of rust. Inoculation with the virus also gave protection against subsequent TMV infection, but results with aqueous diffusates were in this case inconclusive.

On bean leaves inoculated with TMV 2–14 days after rust inoculation, a dark, necrotic ring appeared in 3–5 days round some of the rust pustules; the more mature the pustule, the quicker the ring formation. At above 30° C. intervals of 1–3 days between rust and TMV inoculations gave smaller necrotic rings than 6–8 day intervals, a difference not observed at lower temps.

Mechanical inoculation with TMV produced only a few small local lesions on Bountiful Bean leaves and none on U.S. No. 3 or Harter nos. 780 and 814, but rusted leaves of all these vars. were shown by the necrotic-ring reaction to be susceptible to TMV infection in an area confined to the periphery of the rust pustules.

Chatterjee (P.). **The Bean root rot complex in Idaho.**—*Phytopathology*, **48**, 4, pp. 197–200, 1958.

At the University of Idaho, Moscow, it was shown that dry root rot of beans (*Phaseolus vulgaris*) in this region was due primarily to *Fusarium solani* f. *phaseoli* [cf. **35**, p. 742], 3 strains being distinguishable by cultural characters and degree of virulence. The pathogen penetrated directly through epidermal cells, through stomata on the hypocotyl, and through wounds. In mature roots the stelar tissue was not invaded though mycelium developed in the cortex and endodermis.

Yerkes (W. D.). **Additional new races of Colletotrichum lindemuthianum in Mexico.**—*Plant Dis. Reptr*, **42**, 3, p. 329, 1958.

During investigations under the Rockefeller Foundation Agricultural Program, Mexico, 3 new races of *C. lindemuthianum* on beans (*Phaseolus vulgaris*) were designated MA–11, 12, and 13 [**36**, p. 295].

Barros (O.), Cardona (C.), Cardeñosa (R.), & Skiles (R. L.). **Angular leaf spot of Bean in Colombia.**—*Plant Dis. Reptr*, **42**, 4, pp. 420–424, 3 fig., 1958.

Unusual losses in the Cauca Valley, Colombia, in 1953–55 from angular leaf spot [*Isariopsis griseola*] of beans [*Phaseolus vulgaris*: **37**, p. 369], especially the var. Algarrobo, previously considered resistant, were attributed to abnormally wet seasons and repeated cultivation of the crop (4 crops a year) without rotation and the use of irrigation. A return of drier seasons has lessened the seriousness of the disease.

Goodman (R. N.) & Dowler (W. M.). **The absorption of streptomycin by Bean plants as influenced by growth regulators and humectants.**—*Plant Dis. Reptr*, **42**, 1, pp. 122–126, 1958.

At the University of Missouri, Columbia, naphthyl acetamide, gibberellic acid, glycerol, and di- and triethylene glycol increased and methyl cellosolve and carbowax 4000 retarded the absorption of streptomycin from foliar sprays by *Phaseolus vulgaris* var. Tendergreen. Absorption was determined quantitatively in sap by the cylinder-agar plate diffusion method, using *Bacillus subtilis* as the test organism.

Wester (R. E.), Drechsler (C.), & Jorgensen (H.). **Effect of freezing on viability of the Lima Bean downy mildew fungus (Phytophthora phaseoli Thaxt.).**—*Plant Dis. Reptr*, **42**, 4, pp. 413–415, 4 fig., 1958.

At Beltsville, Maryland, pieces of lima bean [*Phaseolus lunatus*] seedlings, inoculated with *Phytophthora phaseoli* [**37**, p. 63], kept for 4 days at 100% R.H. at 65–70° F. and then at 50% RH for 24 hr. to induce heavy sporulation, were placed in screw top bottles and stored at −10°. The fungus remained viable for over 100 days with no loss of pathogenicity.

Paul (H. L.), Brandes (J.), & Quantz (L.). **Versuche zur Reinigung und Darstellung des echten Ackerbohnenmosaik-Virus.** [Attempts at purification and definition of the true Broad Bean mosaic virus.]—*Phytopath. Z.*, **31**, 4, pp. 441–443, 1 fig., 1 graph, 1958.

A description is given of the isolation of the broad bean true mosaic virus [**33**, p. 461] from leaves of Dippes Foli pea plants mechanically inoculated with strain EV 11. Electron microscopic examination showed that it belongs to the so-called spherical viruses and has a diam. of 25–30 mμ, but is in reality polyhedral. Thus it is possible to differentiate it morphologically from *Phaseolus* virus 2 [bean yellow mosaic virus] and other thread-like viruses, such as pea mottle virus, and from the spherical broad bean mottle virus.

Banga (O.) & Petiet (J.). **Breeding male sterile lines of Dutch Onion varieties as a preliminary to the breeding of hybrid varieties.**—*Euphytica*, **7**, 1, pp. 21–30, 1958. [Dutch summary.]

At the Institute of Horticultural Plant Breeding, Wageningen, disease control on onions is an extremely important condition for the success of breeding work, many plants having been lost in recent years. *Peronospora destructor* can be controlled by zineb; *Botrytis allii* cannot be directly destroyed, but its activity can be reduced by drying the bulbs, if unfavourable weather conditions do not allow them to ripen fully.

Marlatt (R. B.). **Onion Fusarium basal rot in Arizona.**—*Plant Dis. Reptr*, **42**, 5, pp. 667–668, 1958.

F. oxysporum f. *cepae* [**35**, p. 881] caused serious losses in late May, 1956, near Tempe, Arizona. L 690 and Granex were significantly less affected than Eclipse and Texas Hybrid 28. In the greenhouse onion bulbs were readily infected after the roots had been injured mechanically. Bulbs grown in inoculated soil and apparently healthy at harvest developed basal rot when stored for 3 months at 75–85° F.

Gaudineau (M[arguérite]) & Lafon (R.). **Traitements de la pourriture blanche de l'Ail.** [Treatments against Garlic white rot.]—*C. R. Acad. Agric. Fr.*, **44**, 4, pp. 178–183, 2 graphs, 1958.

In preliminary experiments in the glasshouse and the laboratory at the Station de Pathologie Végétale du Sud-Ouest (I.N.R.A.), Pont-de-la-Maye, Gironde, with 6 different fungicides, the best control of white rot (*Sclerotium cepivorum*) of garlic grown in experimentally contaminated soil was given by PCNB [cf. **35**, p. 381] (30% active material) and TCNB [tecnazene] (6% active) applied directly to the setts (600 and 3,000 g./100 kg., respectively) immediately before planting, or twice to the soil (by sprinkling or dusting) after planting (30 and 150 g./sq. m.).

Linn (M. B.) & Lubani (K. R.). **Zineb as a protective fungicide for the control of Asparagus rust.**—*Plant Dis. Reptr*, **42**, 5, pp. 669–672, 1958.

At Rochelle, Illinois, 65% zineb spray gave better control of *Puccinia asparagi* [**36**, p. 508] in the field than maneb, ferbam, or captan. Eight applications at

about 8-day intervals from 18 June were more effective than 4 or 6. Zineb is recommended at 2–3 lb./100 gal./acre, beginning shortly after harvest and continuing at 8- to 10-day intervals to mid-Aug.

CROSSAN (D. F.) & RAHN (E. M.). **The development and evaluation of resistant Pepper varieties and selections by means of artificial inoculation in the field with Tobacco mosaic virus.**—*Plant Dis. Reptr*, **42**, 1, pp. 48–50, 1958.

In field inoculation tests at the University Substation, Georgetown, Delaware, the yield of the susceptible California Wonder chilli pepper (*Capsicum frutescens* var. *grossum*) [**36**, p. 677] was much reduced by tobacco mosaic but Yolo Wonder A, Keystone Resistant Giant, and a Caldel selection were highly resistant (no symptoms and high yield).

CHANDLER (W. A.). **Control of bacterial spot and ripe rot of Pimiento Pepper.**—*Plant Dis. Reptr*, **42**, 5, pp. 652–655, 1958.

At Georgia Experiment Station spraying Truhart Perfection (*Capsicum*) with mixture of streptomycin and basic copper sulphate, using 2 formulations of agrimycin 500 (10% Cu+10% streptomycin, 2 lb./100 gal. or 35%+3%, 3 lb.), proved the best of 17 fungicides for overall control of bacterial spot (*Xanthomonas vesicatoria*) [**36**, p. 806], commonly present, and ripe rot (*Vermicularia* [*Colletotrichum*] *capsici*) [**34**, p. 126], which had caused an almost total crop loss, in the field in 1957. Mixtures of streptomycin with maneb or thiram controlled bacterial spot, although phaltan (N-trichloromethyl thiophthalimide)+streptomycin was ineffective against both diseases; phaltan used alone at 2 lb. was effective against ripe rot. Chlorosis and reduced yield were produced by dyrene and by a mixture of streptomycin and thiram.

MÜLLER (H. W. K.) & SAUTHOFF (W.). **Zum Auftreten und zur Bekämpfung einer durch Sclerotinia sclerotiorum (Lib.) De Bary hervorgerufenen Krautfäule an Blattpetersilie (Petroselinum hortense Hoffm.) im Winteranbau unter Glas.** [On the occurrence and control of a top rot of leaf Parsley (*Petroselinum hortense* Hoffm.) caused by *Sclerotinia sclerotiorum* (Lib.) de Bary in winter culture under glass.]—*Zbl. Bakt.*, Abt. 2, **111**, 6–7, pp. 178–184, 1 fig., 1958.

Although *S. sclerotiorum* is well known as an agent of parsley root rot [**11**, p. 489], it does not appear to have been previously reported as a leaf pathogen. In the market-gardening district round Hamburg, Germany, where intensive production of the crop is practised, the fungus is severe on the leaves, beginning at the outer ones and spreading inwards. The circular, glassy spots expand rapidly and are soon covered with conspicuous mycelium with a consistency of cotton wool. The tissue near the lesions becomes soft and watery, causing the leaves to collapse. The affected plants usually die, but recovery may ensue as long as the 'heart' and the root system are not involved.

Infection is preventable by spraying with 4% brassicol-super at the end of Oct. and mid-Nov., but this method is not recommended to growers pending further research on the toxicological properties of the chemical in relation to health. For the present sowing at the end of July instead of early Sept. is advised to enable the plants to outdistance the pathogen.

FRY (P. R.). **The relationship of Olpidium brassicae (Wor.) Dang. to the big-vein disease of Lettuce.**—*N.Z.J. agric. Res.*, **1**, 3, pp. 301–304, 1958.

Roots of lettuce plants with big vein symptoms [cf. below] from several localities in New Zealand were examined microscopically and found to contain resting spores and zoosporangia of *O. brassicae* in the surface cells. Inoculation with tobacco necrosis virus isolated from big-vein plants did not cause big vein symptoms, but

inoculation with resuspended sediment of root sap from infected plants containing *Olpidium* spores did, while the supernatant did not, suggesting that *O. brassicae* is the cause of big vein.

Veronica tournefortii, *Stellaria media*, and *Spergula arvensis* are also hosts of *O. brassicae*; their root sap inoculated to lettuce also caused big vein symptoms. Soil treatment with captan, phygon, copper oxychloride, and thiram reduced the incidence of the disease.

GROGAN (R. G.), ZINK (F. W.), HEWITT (W. B.), & KIMBLE (K. A.). **The association of Olpidium with the big-vein disease of Lettuce.**—*Phytopathology*, **48**, 6, pp. 292–297, 1958. [19 refs.]

In further studies at the University of California, Davis [**37**, p. 129], Imperial 615 lettuces planted in soil infested with big-vein [see above and below] treated with DD, chloropicrin, CBP 55, or CS_2 did not develop the disease, though in such soil treated with ethylene dibromide they did. No infection developed in plants growing in contact with big-vein-diseased root material that had been surface sterilized, or in plants dipped in $HgCl_2$ and transferred to sterilized soil after 8 weeks in infested soil.

Roots of diseased plants were consistently found to be infected by *O. brassicae* but not those of healthy control plants. Surrounding the collar of lettuce seedlings with infected lettuce roots or roots from some, but not all, other hosts infected by *O.* caused development of big-vein. When zoospore suspensions of the fungus were passed through a filter that retained the spores but would allow passage of a virus the filtrate did not induce symptoms. It is therefore considered that there is a causal relationship between *O. brassicae* and big-vein disease, the symptoms being induced by a substance produced by the fungus and translocated to the leaves.

O. brassicae capable of infecting lettuce was found in celery, radish, onion, broccoli, and *Lactuca serriola*, all without apparent symptoms.

TOMLINSON (J. A.) & SMITH (BRIDGET R.). **Big vein disease of Lettuce in Britain.** —*Plant Path.*, **7**, 1, pp. 19–22, 1 pl., 1958.

Further details are given of lettuce big vein [**37**, p. 512 and above] in the British Isles. In May 1957 affected Lobjoit's Green cos lettuce occurred on a farm at Esher and on 3 other holdings in Surrey, and in Oct., 1957, the disease was found on 7 farms near Formby and Ormskirk, Lancs. While the symptoms of big vein in some respects resemble those of lettuce mosaic virus, mosaic causes vein clearing with a diffuse mottling of the leaves, whereas big vein causes a broad veinbanding with no mottling or generalized yellowing. The disease was transmitted from soil taken from beneath affected plants on each of 3 farms. Numerous isolates of tobacco necrosis [virus: **33**, p. 700] were obtained from lettuce plants with big vein symptoms and also from lettuces not so affected.

WEBB (F. W.). **Antibiotics in the control of plant diseases.**—*Agriculture*, **64**, 10, pp. 493–497, 1 pl., 1958.

Following a brief review of the uses of antibiotics in controlling plant diseases, the results are presented of trials carried out in the winters of 1955–6 and 1956–7 on the use of 3% griseofulvin dust against *Botrytis cinerea* on glasshouse-grown lettuce [**37**, p. 19]. One pre-planting application followed by 2 or 3 more (at 14 lb./acre) at monthly intervals after planting reduced losses by 50% and increased the size of the lettuces. At least 4 weeks should elapse between the last application and harvest.

BROOKE (M.) & CHESTERS (C. G. C.). **The use of tetrachloronitrobenzene isomers on Lettuce.**—*Ann. appl. Biol.*, **46**, 2, pp. 159–166, 1 pl., 1958.

In field experiments at the University of Nottingham from 1951–55 on winter

lettuce in boxes under glass, in the open, and on commercial crops in unheated glasshouses, each of the 3 isomers of tetrachloronitrobenzene, applied as a 5% dust at $\frac{1}{4}$ and $\frac{1}{2}$ oz./sq. yd., gave significant control of *Botrytis cinerea* [see below], but the 2:3:4:5 isomer was inferior to the other two. It delayed hearting at both rates and for tecnazene and 2:3:4:6 isomer at $\frac{1}{2}$ oz./sq. yd. the delay in a commercial crop was over 14 days.

A 5% tecnazene dust for the control of *B. cinerea* on lettuce in unheated glasshouses should be used at a rate not exceeding $\frac{1}{4}$ oz./sq. yd. and applied at intervals of not less than 1 month, every care being taken to ensure even distribution. Hearting may be delayed for 7–14 days.

Brook (M.) & Chesters (C. G. C.). **Trials of tecnazene smoke generators for the control of Botrytis in Lettuce.**—*Plant Path.*, 7, 1, pp. 6–9, 1958.

In further experiments at the University of Nottingham tecnazene emitted as a smoke from a generator containing a burning mixture (B.P. 1873/53) gave promising results against *Botrytis* disease of lettuce [*B. cinerea*: cf. **37**, p. 210]. The generators use more tecnazene than a 5% dust, but are inexpensive. The dose for commercial greenhouses should probably be about 1 oz./200 sq. ft. of bed.

Goltz (H.). **Kritische Betrachtungen über Rostpilze an Salat anläßlich eines starken Auftretens des Salatrostes (Puccinia opizii Bubak).** [Critical observations on rust fungi on Lettuce in connexion with a severe outbreak of Lettuce rust (*Puccinia opizii* Bubak).]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **12**, 3, pp. 50–55, 3 fig., 1958. [English and Russian summaries.]

P. opizii [cf. **32**, p. 280] is reported on lettuce under glass in a nursery at Nächstneundorf (Kr. Zossen) in 1957. The life cycles of this heteroecious rust, and of the autoecious *P. lactucarum* and *P. prenanthis* are discussed in some detail.

De Sarasola (Maria A. R.) & Sarasola (A. A.). **Una enfermedad de la Lechuga producida por Stemphylium botryosum en la Argentina.** [A disease of Lettuce caused by *Stemphylium botryosum* in Argentina.]—*Rev. Fac. Agron. La Plata*, **33**, 1 a, pp. 83–91, 1 pl., 1957.

From the Direccion de Defensa del Agronomia, La Plata, the disease of lettuce caused by *S. botryosum* (*Pleospora herbarum*) [cf. **34**, p. 125], reported for the 1st time in Argentina, is fully described.

Ceponis (M. J.) & Friedman (B. A.). **Effect of sterile filtrates of cultures of Pseudomonas marginalis upon Lettuce tissue.**—Abs. in *Phytopathology*, **48**, 5 (1), p. 261, 1958.

Vein browning, russet spotting, and soft rot maceration of the tissues were induced in Romaine and Iceberg-type lettuces with sterile, cell free filtrates of 3- to 4-day old cultures of *P. marginalis* [cf. **34**, p. 340] grown in lettuce broth. The symptoms appeared within 17 hr. on leaves standing in the filtrate, initially under reduced pressure, and with 100 p.p.m. oxytetracycline added. Autoclaved filtrates and sterile lettuce broth caused no symptoms.

Hein (Alice). **Das Gurkenmosaikvirus an Zichorie in Mitteldeutschland.** [Cucumber mosaic virus on Chicory in central Germany.]—*NachrBl. dtsch. PflSchDienst, Berl.*, N.F. **12**, 2, pp. 38–39, 1 fig., 1958.

Since 1952 heavy attacks of chicory mosaic near Halle and Aschersleben have been caused by cucumber mosaic virus, identified by inoculation into a series of test hosts. It differed from Roland's strain [**36**, p. 301] in being transmissible to tomato, lettuce, and *Gomphrena globosa*, on which typical symptoms were produced.

Gaudineau (M[arguérite]) & Lafon (R.). **Sur la maladie à sclérotes du Topinambour.** [On the sclerotial disease of Jerusalem Artichoke.]—*C. R. Acad. Agric. Fr.*, **44**, 4, pp. 177–178, 1958.

Jerusalem artichokes [*Helianthus tuberosus*] grown in W. and S.W. France for cattle feed are frequently attacked by a rotting of the stems and tubers caused by species of *Sclerotinia*. Usually *S. minor* was isolated, but occasionally *S. sclerotiorum* [cf. **33**, p. 518, *et passim*]. The attack generally occurs at midsummer. The evidence showed that severe infection occurred only in soils planted with this crop for several years in succession. Infection experiments (in contaminated soil) demonstrated that the early D 19 and D 27, the so-called German var., and D 25 (all white tubers) were susceptible, while V 71, D 1 (with pink tubers), D 2, and Patate Vilmorin (white tubers) were resistant. In preliminary experiments on control calcium cyanamide greatly increased yields.

Ragimov (U. A.). Новые заболевания Тыквенных культур в западных районах Азербайджанской ССР. [New diseases of Cucurbits in the western districts of Azerbaijan SSR.]—Докл. Акад. Наук Азерб. ССР [*Proc. Acad. Sci. Azerb. SSR*], **14**, 1, pp. 65–70, 1958. [Azerbaijan summary.]

During 1954–56 cucurbit diseases were studied in 7 districts of Azerbaijan. In all *Fusarium* wilt was widespread in May and June, especially on melons, cucumbers, and watermelons, with 50%, 19%, and 16% infected plants, respectively. *Phytophthora capsici* was widespread on cucumbers and was also noted on melons and watermelons. *Pythium aphanidermatum* was recorded on cucumbers, melons, squash, and pumpkins; *Rhizopus nigricans* [*R. stolonifer*] on marrows, pumpkins, and melons, attacking usually 15–30% of the plants; *Macrosporium pantophagum* on melons, marrows, pumpkins, and watermelons; and *Rhizoctonia bataticola* [*Macrophomina phaseoli*], widespread on melons, often attacked up to 40% of the fruit. Anthracnose caused by *Colletotrichum lagenarium* [**36**, p. 502] at times destroyed 100% of pumpkins in storage. The disease is widespread in 6 other States of U.S.S.R.

It was shown that cucurbits planted in fields previously sown with lucerne were attacked much less by *Fusarium* sp., to which all melon varieties are susceptible, the Melitopol'ski watermelon being the most resistant.

Bordeaux mixture sprays are recommended for all the diseases, and dusting with granosan at 2–3 g./kg. seed.

Nelen (E. S.). Эффективный препарат против мучнистой росы. [Effective compound against grey mould.]—*Plant Prot., Moscow, 1958*, 1, p. 42, 1958.

In the Vladivostok region, U.S.S.R., in 1956, tests with phygon alone or in combination with Bordeaux mixture and nirit for the control of grey mould [*Botrytis cinerea*] and gummosis [*Cladosporium cucumerinum*] on cucumber, showed that only phygon alone at 200 g./100 l. water gave control when sprayed not less than 3 times at 10-day intervals beginning in the end of May or in early June.

Natti (J. J.), Schroeder (W. T.), Hervey (G. E. R.), & McEwen (F. L.). **Value of insecticide-fungicide combination treatments as protectants for seed of Cucumber and winter Squash.**—*Plant Dis. Reptr*, **42**, 1, pp. 127–133, 1958.

In New York State increasing numbers of growers are using combined seed treatments of cucurbits against seed rotting fungi and the seed-corn maggot (*Hylemya ciliorura*).

At the Agricultural Experiment Station, Geneva, orthocide 75 and arasan SF, each at 0·26 and 0·52% by seed wt., combined with dieldrin, heptachlor, or lindane (providing 1:4 and 1:8 ratios of insecticide-fungicide) gave better stands of cucum-

ber and squash, regardless of dosage of pesticide, than the fungicides alone. In fine sandy loam arasan SF and orthocide 75 proved equally effective on cucumber and squash and in silt loam on cucumber, where the latter was better than the former on squash.

MOURSI (M. A.) & SIRRY (A. R.). **The relation of nitrogen and dusting with sulphur to the spread of powdery mildew and yield of summer Squash.**—*Ann. agric. Sci., Cairo*, **1**, 1, pp. 313–317, 1956. [Arabic summary. Received 1958.]

Tests on the control of *Erysiphe cichoracearum*, which attacks squash throughout the year in Egypt, were carried out on the summer crop (sown 27 Jan. 1955) and the nili crop (25 Sept.), using the var. El-Askandarani and 4 N levels coupled with 3 S dustings at 10-day intervals beginning 30 days after sowing. Disease intensity was expressed as percentage of leaf and stem area infected. High N (160 kg. Ca nitrate/feddan summer crop; 300 kg. nili crop) reduced infection and increased growth and yield. S reduced percentage infection from 29 (undusted)–13·8 (summer) and 24–6·5 (nili), increased the yield (in tons/feddan) from 10·18–14·19 (summer) and 5·403–7·14 (nili), and also the number of fruits and average weight.

[For a preliminary account see M. A. MOURSI & M. A. TAYEL. Relation of nitrogen and dusting with sulphur to the growth of Squash and its parts.—Ibid., **1**, 1, pp. 107–116, 2 graphs, 1956.]

MCLEAN (D. M.). **A seed-borne bacterial cotyledon spot of Squash.**—*Plant Dis. Reptr*, **42**, 4, pp. 425–426, 1 fig., 1958.

A bacterial disease of squash seedlings, at Whidbey Island, was identified as *Xanthomonas cucurbitae* [**9**, p. 576], not previously reported from Washington.

GOODE (M. J.). **Physiological specialization in Colletotrichum lagenarium.**—*Phytopathology*, **48**, 2, pp. 79–83, 1 fig., 1958.

An expanded account of an investigation already noticed [**36**, p. 373]. The 3 races of *C. lagenarium* could be distinguished on 3 differential hosts, Butternut squash (immune from 3, susceptible to 1 and 2), Charlston Gray watermelon (resistant to 1 and 3, susceptible to 2), and the cucumber P.I. 163213 (susceptible to 1, resistant to 3). Model Cucumber was susceptible to all 3 races.

AYCOCK (R.). **Effect of seed treatments on development of anthracnose in Watermelon seedlings.**—*Plant Dis. Reptr*, **42**, 1, pp. 134–141, 1 fig., 1958.

At Blackville, S. Carolina, semesan, arasan, and spergon, applied as protectants to experimentally infested seed of Florida Giant watermelon, failed to control *Colletotrichum lagenarium* [**36**, p. 678], whereas $HgCl_2$ gave generally excellent, though inconsistent results. Seedox (dust, 0·3% by seed wt.), panogen, and emmi (both liquid, 1:1,500/10 min.) gave almost complete control in the greenhouse and field and should perform well under natural conditions, but testing on other varieties is desirable.

NIKULINA (Mme N. K.) & SHVORNEVA (Mme A. M.). Токсический бактериоз Арбузов. [Toxic bacteriosis of Watermelon.]—*Plant Prot., Moscow, 1957*, p. 55, 1 fig., 1957.

At the Sanitary Institute, Stalingrad, inoculation of watermelons with *Proteus* sp. from a diseased fruit reproduced the convex brown patches like warts, some as small as pinheads, some about 1 cm., with a clearly defined centre. Inside, the tissue had at first a nodular appearance and later became rotted. The skin remained hard until the whole of the inside was a slimy liquid. The disease attacks only mature fruit in wet conditions with temperatures higher than 16–18° C.

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